DOCUMENT RESUME

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ABSTRACT

"Waste in Place" is an interdisciplinary, sequential curriculum for kindergarten through sixth grade. The eight units in the curriculum (one offering background information for teachers and one for each grade level) offer students the opportunity to learn about proper management of solid waste and the role of the individual in determining the best waste management processes for his/her community. Individual grade units may be used as a separate course of study, learning episode, or mini-course. In addition, many unit activities are suitable across grade levels. Each unit includes purpose, concept fostered, objectives, evaluation methods, recommended time schedule, key vocabulary words, learning activities, and recommended resources (audio-visual aids and bibliography). Teacher background information, program philosophy, and vocabulary words are included in an introductory section. Areas addressed in units include: difference between natural and man-made objects (kindergarten); difference between waste and litter (grade 1); importance of containerizing trash (grade 2); normative system supporting attitudes toward waste handling in the community (grade 3); how normative system relating to waste handling is applied in homes, school, and neighborhood (grade 4); the wide range of waste disposal techniques (grade 5); and, through a simulation game, the decision-making process involved in waste management (grade 6). (JN)

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WASTE IN PLACE

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TEACHER BACKGROUND

"Waste In Place" is a sequential curriculum for Kindergarten through Sixth Grade on the relationships between personal attitudes and solid waste handling at the local level. It is based on the same normative system change process that underlies the CLEAN COMMUNITY SYSTEM, the behavioral approach to changing attitudes relating to waste management, which is reducing litter by as much as 70% in the many cities now certified to participate in the CCS.

Both "WIP" and CCS are programs of Keep America Beautiful, Inc., founded in 1953 to promote personal involvement in grassroots programs to improve the environment. "WIP" was initiated, largely, in response to teachers in CCS communities who recognized the need to instill in their students the same positive attitudes toward the role of the individual in community development.

"WIP" was field tested for three years prior to its national rollout in 1979. A reading evaluation was conducted by teachers in 20 cities during 1976. A draft curriculum was implemented in Charlotte, N.C. (a principal CCS demonstration site) and Huntington, N.Y., during 1977 and, after revisions based on those tests, in eight certified CLEAN COMMUNITY SYSTEM cities during 1978. (A final evaluation report on these field tests is available from Keep America Beautiful, Inc.)

"Waste In Place" contains seven grade units, each individually bound in this loose-leaf. In those cases where there are several classes at the same grade level, the school administration will need to photocopy the unit(s) for each teacher at each grade level.

School systems might name a coordinator for the "Waste In Place" implementation -- an environmental education specialist or curriculum developer in the elementary schools, a science or social studies teacher from the high school, an environmental educator or biology instructor from a nearby college or university, or some other teacher with a particular interest in this area.

This coordinator should read all seven units and carry out these tasks:

1. Distribute the "WIP" Background Information (see below) to all participating teachers.

2. Distribute the appropriate units to teachers.

3. Contact those teachers whose units require involvement of individuals outside the school system (particularly municipal agencies) and coordinate requests for speakers, printed materials, films, tours, etc.

The coordinator might encourage teachers at all grade levels to take part in the visits by resource people, and the sanitation equipment demonstration outlined for the upper grades.

4. Develop a resource list of books, films, filmstrips, etc., relating to solid waste management which are available from local sources (public, school and university libraries, bookstores, audio-visual centers, sanitation department, county extension office, etc.), and distribute this list to all participating teachers. The coordinator might, too, place appropriate library materials on reserve for the period in which "WIP" will be implemented.

Part of this resource list might include names and phone numbers of local residents who are knowledgeable in the field of environmental education and waste management: the coordinator or members of the Clean City Committee or Commission, members of the beautification commission, garden club, women's club conservation committee, voluntary recycling program, sanitation/public works department, Chamber of Commerce environmental improvement committee, etc.

5. The coordinator might want to consider, also, tying in "Waste In Place" with either of two Keep America Beautiful, Inc. programs: Keep America Beautiful Day (the fourth Saturday in April, although local observances may vary because of climatic conditions), and the KAB National Awards Program (deadline usually in August), which has a separate category to recognize outstanding environmental improvement efforts by elementary schools.

"WASTE IN PLACE"

TEACHER BACKGROUND

"Waste In Place" is a sequential curriculum for Kindergarten through Sixth Grade which offers participating students the opportunity to learn about proper management of solid waste and the role of the individual in determining the best waste management processes for his or her community.

Each grade unit may also be used as an individual course of study, learning episode or "mini-course." Many of the activities are suitable for involving a number of grade levels -- such as visits by sanitation workers or a demonstration of sanitation equipment.

"WIP" was developed, largely, in response to requests by elementary school teachers in municipalities and counties certified to participate in the CLEAN COMMUNITY SYSTEM (CCS), sponsored by Keep America Beautiful, Inc. CCS is a total-community approach to changing individual attitudes toward the handling of waste. Cities certified in the CCS have sustained litter reductions as high as 70%. Each community implementing a CCS program establishes a Clean City Committee and, generally, five Sub-committees: Business & Industry, Civic Organizations, Communications, Municipal Operations and Schools. The CCS Schools Sub-committees were deeply involved in the field testing and evaluation of "WIP."

Keep America Beautiful, Inc., which developed and field tested "WIP," was established in 1953 to promote individual involvement in environmental improvement. It is supported by more than 100 companies and trade associations representing a broad cross-section of American industry. KAB's National Advisory Council is comprised of 65 national public service organizations and professional societies and 17 agencies of the federal government, and counsels KAB on specific areas of program development, including education and curriculum development. KAB also maintains a network of state and local affiliates (including, most notably, the cities certified in the CCS), through which it disseminates program information.

In the development of "WIP," KAB was assisted by Earth Systems Group, Orefield, Pa., a consulting firm in environmental education and related areas of study.

"Waste In Place" reflects the five years of field testing and national rollout that underlies the success of the CLEAN COMMUNITY SYSTEM, in that it is a grassroots-oriented program which helps students understand that solid waste management, like many other community issues, is a decision-making process that must involve the entire citizenry if it is to be successful.

The "WIP" curriculum is interdisciplinary in its approach. Facets are relevant to vocabulary study and language arts, arithmetic, science, civics and social studies -- in addition to providing many opportunities for interaction among students, leading to the development of interpersonal skills.

Stated briefly, the functions of each study unit are:

Kindergarten - students learn to differentiate between natural and man-made objects. Listing characteristics of objects found in the home and school; how these characteristics indicate whether the object is natural or man-made; selection of natural and man-made objects in the outdoor environment; differentiation between natural and man-made objects by students; grouping objects by characteristics.

First Grade - students learn to perceive the distinctions between waste and litter. Understanding the difference between "useful" and "waste"; how improperly containerized waste becomes litter; why "natural" waste is not litter; identifying sources of litter within the neighborhood; waste management in the cafeteria.

Second Grade - students study the importance of containerizing trash. Understanding characteristics of a container; waste containers and their presence in everyday life; experiment: half the classroom is permitted to use wastebaskets, the other half is not -- experiment continues for six days; evaluating individual responses to the experiment; understanding how experimental situation would apply to the community.

Third Grade - students examine the "normative system" that supports attitudes toward waste handling in their community. Introducing the concept of "habit"; listing personal habits; identifying "good" habits, "bad" habits and those which have no particular value; listing personal activities during the course of the day, and identifying normative patterns arising out of them; role-playing classroom and neighborhood situations relating to normative behavior; understanding interrelationships of norms (normative networks); identifying normative systems operative in the school environment; experiment: students distribute snacks wrapped in paper at dismissal time and unobtrusively observe how students dispose of wrappers, also noting whether placement of trash receptacles at any points would reduce littering.

Fourth Grade - students study how the "normative system" relating to waste handling is applied in their homes, school and neighborhood. Identifying improperly managed waste as pollution problem, related to air and water pollution; calculating amount of waste generated by household; understanding how waste handling is a pollution problem to be solved through individual involvement; locating loose trash around the school and its probable source; developing master map of sources of loose trash and location of litter receptacles in the neighborhood; creation of a plan to address issue.

Fifth Grade - students consider the wide range of waste disposal techniques now employed in their community and throughout the country. Difference between properly managed waste and the pollution problems resulting from improperly managed waste; understanding various waste disposal and processing practices and interrelationships between them; visit to the city sanitary landfill; creation of "mini-landfills" in the classroom; understanding incineration of wastes; creation of a "mini-incinerator"; understanding recycling; impact of these waste disposal processes on environmental quality and the community.

Sixth Grade - through a simulation game that requires them to decide (for an imaginary community) where the new sanitary landfill will be located, students experience the decision-making process involved in waste management. Considering the manpower, equipment and resources involved in waste collection and disposal, at present, in the community; researching (by evaluating situations in the students' own community) waste management practices, through committees (Legal, Equipment, Disposal Methods, Temporary Landfill Siting); presentations by the city landfill operator, sanitation workers, citizens involved in voluntary reclamation, or resource recovery, programs locally; final presentation to simulated "City Council" to determine location of new landfill.

Each unit is accompanied by an evaluation instrument, to be administered at the start and conclusion of each grade unit, as well as vocabulary lists and bibliographic and audio-visual references for each grade. Scheduling of "WIP" implementation will need to be done by the individual teacher, since some units require more classroom time than others. Teachers should identify local residents who are knowledgeable about waste management practices, and use them as resource people; also, contact school and public libraries and reserve materials relating to waste handling for student use.

Vocabulary included in the seven "WIP" units is listed on the following pages.

"WASTE IN PLACE"
VOCABULARY

BEHAVIOR - the way in which people act.

BIODEGRADABLE - material which decomposes naturally.

COMPACT - to pack closely together.

COMPACTOR - a machine which compacts solid waste.

CONTAINER - something that holds something else -- a box, a trash can, an eggshell, a bottle, a garbage truck. CONTAINERIZE: to put or keep something in the proper container.

DECOMPOSE - to break down into basic elements; to rot.

DISPOSE - to get rid of waste; properly, by putting it into a proper container for collection and final processing by burying, burning or recovery of the resources it contains.

DUMPSTER - large refuse container, usually used by stores, restaurants, etc., to keep waste until it is collected by a sanitation department or other refuse hauling service.

ENERGY - power, which may be in several forms: steam, electrical, atomic, chemical, human, etc.

ENERGY RECOVERY - incinerating waste in such a way that the heat from the burning process can be used to make steam for heating, cooling and/or to make electricity.

ENVIRONMENT - your surroundings, inside or out-of-doors.

GARBAGE - another word for solid waste, especially for household waste.

GARBAGE CAN - large covered container used to store household waste until it is collected.

HABIT - an action a person does over and over again without thinking about it.

INCINERATE - reduce the amount of waste to be disposed of by burning it.

INCINERATOR - a plant designed to reduce waste volume by burning, turning the waste into gases.

LANDFILL - a large, outdoor area for waste disposal. Landfills where waste is improperly managed (i.e., can pollute the air or water or where waste can become litter) are often called open dumps. Those where waste is properly managed are called sanitary landfills.

LEACHATE - water which has drained through something (usually, solid waste), dissolved some of the material and become polluted as a result; a liquid containing decomposed waste, bacteria and other noxious and potentially harmful materials which drains from landfills and must be collected and treated so as not to contaminate water supplies.

LITTER - man-made (or man-used) solid waste that is put in the wrong place or allowed to escape from a container.

LITTERING - making an area messy because you fail to get rid of waste properly, or store it so it can't escape; mishandling waste.

LITTER BASKET - a container, usually used outdoors, on sidewalks, in parks, for disposing of small waste items.

MAN-MADE - anything made by people or machines - clothes, books, cakes, milk cartons, desks, etc.

NATURAL - anything in our world not made by people or machines: eggs, rocks, trees, leaves, rabbits, flowers, water, kittens, etc. ("things found in nature").

NATURAL (OR ORGANIC) WASTE - things not made by people (once living material) that cannot be used any more - eggshells, sticks, dead flowers, leaves, grass clippings, etc.

NORM - a habit most people have that makes them tend to act in a certain way at certain times or places; behavior that is expected, accepted, the unwritten rule.

NORMATIVE SYSTEM - a network of norms followed by people, which strengthen an individual habit and make it harder to change.

POLLUTE - to contaminate; to dirty. (Also POLLUTION - those things which contaminate.)

RECEPTACLE - a container that is made to have things put into it. As used in this curriculum, a container for small waste items, a litter basket, a waste basket.

RECYCLING - collecting and treating solid waste for use as raw material in the manufacture of the same or similar products, usually through low-technology processes; reusing material instead of discarding it; making new materials from used ones.

REFUSE - another word for solid waste.

RESIDUE - what is left after waste has been incinerated, or after all the recoverable resources have been recovered.

RESOURCE - something that can be used to make something else -- wood into paper, iron ore into steel, bauxite into aluminum, sand into glass, old cans into new ones, old bottles into new ones, old newspapers into cardboard.

RESOURCE RECOVERY - taking usable materials (resources) out of solid waste, usually through high-technology processes. (What is not usable still has to be disposed of.)

SANITARY LANDFILL - a large, outdoor area for waste disposal where discarded materials are usually compacted before being covered with a layer of earth. (If the earth cover is not thickly and carefully applied, a sanitary landfill can become an open dump.)

SCRAP - another word for solid waste, especially materials left over from construction or manufacturing suitable for reprocessing.

SEWAGE - liquid and solid wastes carried off with ground water in sewers and drains.

SIMULATION - pretend; act out an imaginary situation.

SOLID WASTE - all useless, unwanted or discarded materials -- refuse, trash, garbage, debris.

SOLID WASTE MANAGEMENT - everything that has to be done to get rid of all the waste that is produced in the community. This includes collecting it, transporting it and, finally, processing it in one way or another.

TRANSFER STATION - a place or facility where waste is taken from smaller trash collection vehicles and placed in larger ones for transporting to disposal area. (Sometimes, compacting is done here.)

TRASH - another word for solid waste.

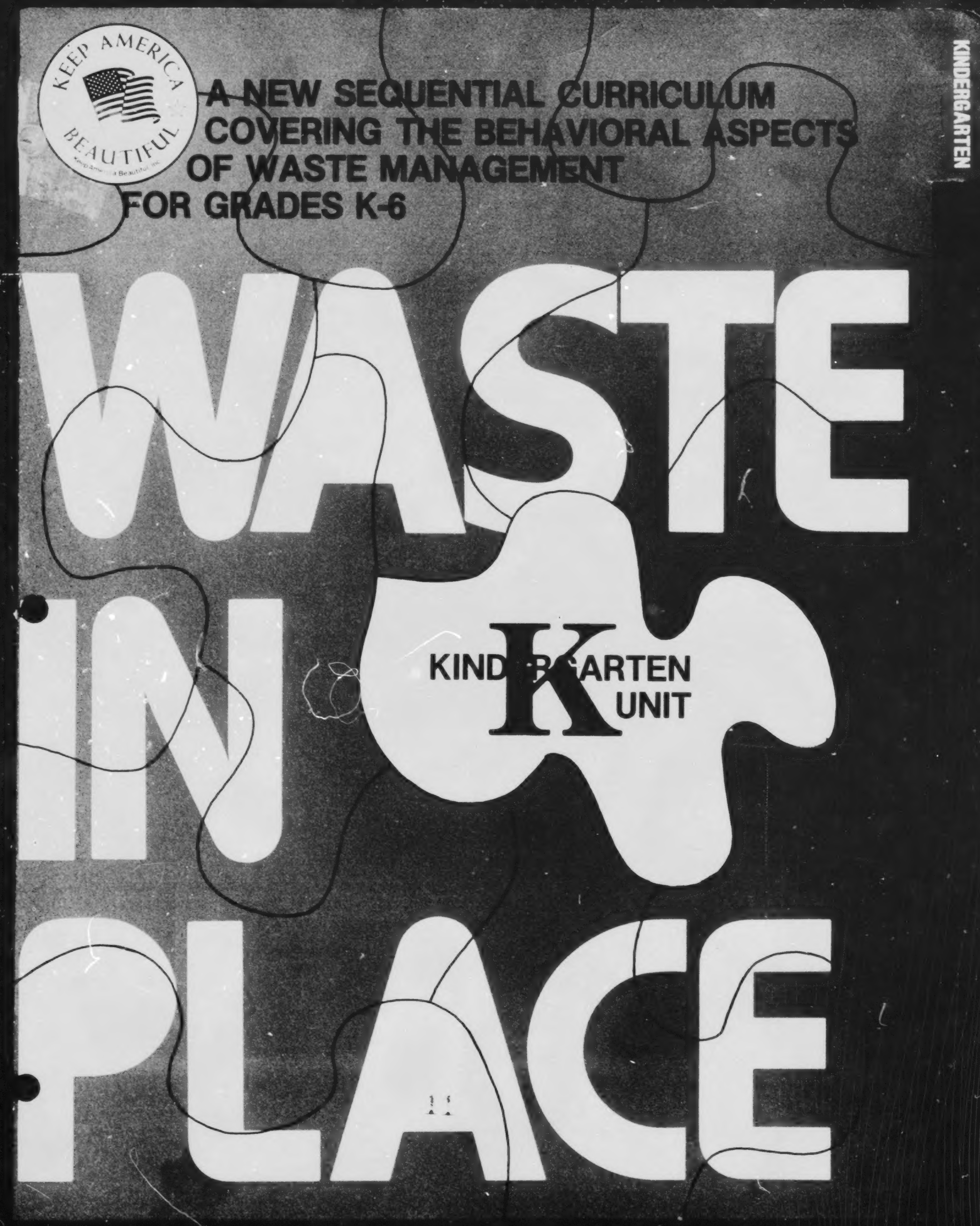
USEFUL - if a thing is useful, it helps us do something; it makes a job easier to do, or it aids us in some way. A useful object may be made by people, machines or nature.

VISUAL BLIGHT - to cause decline or decay in a community's appearance, by littering or in other ways.

WASTE - anything that cannot be used anymore - orange peels, dead leaves, empty packages, coffee grounds, empty cans, broken furniture, etc.

WASTE BASKET - small container, usually used indoors, for disposing of small waste items.

WASTE PROCESSING - doing something to discarded materials so they can be handled more easily (incineration) or so resources can be recovered from them (recycling).



KEEP AMERICA BEAUTIFUL

Keep America Beautiful, Inc.

A NEW SEQUENTIAL CURRICULUM
COVERING THE BEHAVIORAL ASPECTS
OF WASTE MANAGEMENT
FOR GRADES K-6

WASTE IN PLACE

K

KINDERGARTEN UNIT

KINDERGARTEN

K KINDERGARTEN UNIT

PURPOSE

The cumulative series of seven study units constituting the "Waste In Place" curriculum is designed to help elementary school children understand how their own habits affect the environment of their homes, schools and communities and to make them aware of the relationship between their own behavior -- and that of those around them -- and the total physical quality of life.

Solid waste is a major environmental problem in most areas of the country. Loose refuse degrades the aesthetic environment, contributes to water pollution, and is often a health hazard. Disposing of solid waste in an environmentally sound manner is becoming increasingly difficult as space for sanitary landfills runs out and pollution-free incineration becomes more costly. Resource recovery offers an excellent solution in areas where sufficient solid waste is generated to make this economically practical, but such a solution makes it even more important to insure that all waste is containerized and kept in the reclamation system.

There may be little the elementary school child can do to solve air and water pollution problems, but even a five-year-old can learn to handle refuse properly and to understand the relationship between his or her action and the quality of the environment in which he or she lives.

Essential to that understanding in the young child is an appreciation of the difference between natural objects (which, for the most part, do not cause environmental problems when they are no longer useful) and man-made objects (which must be properly disposed of or reclaimed once their function has been fulfilled).

CONCEPT

Our environment is composed of natural and man-made objects.

OBJECTIVES

To enable each child to:

1. find and list five natural objects in the student's environment
2. find and list five man-made objects in the student's environment

EVALUATION

Test the students' ability to distinguish between natural and man-made objects before initiating Learning Episode I. (The test instrument is included below, pg. K-8.) Administer the same test after completing all the Learning Episodes. Score and record individual scores at the completion of each test.

TIME

Depending on the classroom structure, the teacher, and the speed with which students learn the various concepts, this unit should take between 24 and 30 time segments, each lasting approximately 15 min. Teachers should adapt it to meet the needs of their particular class. The first day's time segment and the last day's time segment will be devoted to administering the evaluation instrument.

VOCABULARY

MAN-MADE - anything in our world made by people or machines: cakes, desks, paper, crayons, houses, buses, etc.

NATURAL - anything in our world not made by people or machines: eggs, rocks, trees, leaves, rabbits, flowers, water, kittens, etc.

LEARNING EPISODE ONE

Skills and Learning Activities:

Observation, using words to identify and label objects. Introduction of the concepts "man-made" and "natural." Identifying distinguishing characteristics of natural and man-made objects through perception by senses. Making comparisons. Reinforcing concepts by repeating activity in an outdoor setting. Using discussion and group interaction to increase understanding of concepts.

Preparation: Make two signs, "natural" and "man-made." If all objects required for Activity One are not present in classroom, obtain them before initiating the learning episode.

Activity One (Time: two time segments, each approximately 15 min.)

1. Place the "natural" sign on one table, the "man-made" sign on another nearby. On each table, place items normally found in and around the classroom (or which students would come across in everyday activity), appropriately categorized.

2. List some of the characteristics of each object (hard, soft, warm, cool, furry, smooth, etc.). Indicate whether each object "just grew" or if someone made it. Discuss why these characteristics may show whether the object is natural or man-made. (Teachers may wish to describe all

the "natural" objects at one time, all the "man-made" at another, encouraging an understanding of traits common to each group.)

Activity Two (Time: one 15-min. time segment for #2a; one 15-min. time segment for #2b-e; one 15-min. time segment for #2f.)

1. Place the "natural" sign on one table, the "man-made" sign on another, and the objects used in Activity One on a third.
2. Ask each child to select one object from the table and decide whether it is natural or man-made. Have the child place it on the appropriate table.
    a. Have children examine all the objects on the natural table, determine if they all belong there. If some do not, ask children why.
    b. Have children touch objects on natural table, describe how they feel. Hard, soft, warm, cool, furry, smooth, etc.
    c. Ask children to pick up objects, listen to them, describe the sound they make, if any. Ask if the sound the object makes helps to tell that it is natural.
    d. Have children smell objects, decide if they could tell that they were natural just by the smell.
    e. Ask children if they can safely taste any of the objects on the natural table. If they can, ask if the taste of the object would help them to tell if it is natural or man-made.
    f. Repeat a - e with objects on man-made table.

(NOTE: Teachers may wish to limit discussion of "natural" vs. "man-made" to one or two senses at a time, based on use of other curricular units. E.g., if children have just completed a unit on sound, the teacher may wish to limit the natural and man-made objects used for this activity to those which can be differentiated by sound. Later, the teacher may wish to use those which can be differentiated by touch, etc.)

Activity Three (Time: two or three 15-min. time segments for #1-3.)

Materials:
- Cardboard box
- Assortment of natural and man-made objects
- Blindfold

1. Make a "feelie box" by cutting a hole in the box just big enough for a child's hand.

2. Blindfold one child at a time. Have the rest of the class watch as you put an object in the "feelie box". Have the child guess whether the object is natural or man-made. Give reasons. Remove the blindfold and show the object to the guesser.

3. Repeat procedure with a selection of other children.

4. This same type game can be played with sounds. Use a tape recorder and tape sounds of natural objects such as animals, and man-made objects such as cars.

Activity Four (Time: two or three 15-min. time segments.)

1. Take the class outdoors, to an open area in the school yard.

2. Ask them to walk about for five minutes, pick out an object they want to talk about but not to touch it or tell anyone which object they have picked.

3. Have everyone sit in a circle for a group discussion, asking each in turn to describe the object she or he selected. After each child has finished describing the object she or he selected, ask the group to decide whether that object is natural or man-made. Correct any misidentifications the children may make.

(NOTE: Teachers may wish to spread this activity over two or three days. The walk itself would take place the first day, with the second and/or third days devoted to discussion.)

LEARNING EPISODE TWO

Skills and Learning Activities:

Identifying natural and man-made objects from a collection of both; categorizing object by choice; learning why each fits in its category.

Activity One (Time: one 15-min. time segment for #2a-b; one 15-min. time segment for #3a-b; one 15-min. time segment for #4a-b.)

1. Place a collection of small objects on one table. Place previously made "natural" and "man-made" signs on other tables.

2. Pick up a man-made object, such as a sheet of colored paper. Ask the children if it is man-made or natural. If they answer "natural" ask, "if we planted this in the ground, would it grow next spring? If it won't grow, what would happen to it?" (Decompose.)

   a. Ask the children if this piece of colored paper would be found in a forest. (Almost everything found in a forest is natural.)

   b. Ask the children what to do with the paper when it is no longer useful.

3. Pick up something from the "natural" table and ask the same questions.

   a. If the object is a leaf (which obviously won't grow if it is planted), ask if it does grow, or if it is made bigger by people, like a cook makes a cake bigger by putting filling and frosting on it.

   b. Ask the children what happens to a leaf when it is no longer useful.

4. Have each child, in turn, select one object from the "man-made" table.

   a. Ask the class if the object the child is holding is man-made or natural. Did someone make it from something else or has it always been the way it is now. Ask them if there are other things about the object which indicate that it is man-made or natural.

   b. Have child put object on table with the appropriate sign.

Activity Two (Time: two or three 15-min. time segments.)

1. Each child in the class is to pretend that she or he is a natural object - apple, leaf, flower, kitten, rock - or a man-made object - clock, car, shoe, pencil.

2. When each child has decided what she or he is going to be, ask them in turn, to show and tell what they are, what it is about them that makes them natural or man-made.

LEARNING EPISODE THREE

Skills and Learning Activities:

Reinforcement of "natural" and "man-made" concepts through recollection, identifying others' drawings as natural or man-made; matching objects by category, using blocks or flash cards.

Activity One (Time: 15-min. for #1; one or two 15-min. time segments for #2 and #3.)

1. Ask children to draw a crayon picture of one object they saw on the tables during the previous learning episode.

2. Put the drawings up on the board, one at a time, and ask the children to identify each.

3. Ask each child to select one drawing, other than her or his own, and tell the class whether the object it portrays is natural or man-made.

    a. If a child makes an incorrect identification, initiate discussion on the differences between natural and man-made objects. At the end of the discussion, again ask her or him if the object in the drawing she or he selected is natural or man-made.

Activity Two (Time: one 15-min. time segment.)

1. Divide the children into small groups. Provide with sets of blocks or cards with pictures on them, ask each group to sort the pictures into natural and man-made piles.

2. Review the selection with each group, correct mistakes by initiating discussion of characteristics of object which point to its proper classification.

LEARNING EPISODE FOUR

Skills and Learning Activities:

Reinforcing concept through exercise of choice and elimination. Extending concept to beyond classroom environment. Grouping to reinforce differences, discussing properties of each category.

Preparation: As previous, plus four more signs, two reading "hard" and two reading "soft." Also, sheets of poster board, each labeled either "natural" or "man-made."

Activity One (Time: one 15-min. time segment for #1-4; one 15-min. time segment for #5.)

1. Take class outdoors to an open space.

2. Divide into two groups, one to collect 10 natural objects to be found in the school yard, the other to collect 10 man-made objects. (Be sure that children observe conservation rules and do not pick flowers, pull up plants or deface trees.)

3. Return to classroom, where tables have been set up, one designated "natural," the other "man-made." Place cards marked "hard" and "soft" on each table.

4. Ask children to place objects under the appropriate signs. Demonstrate with your own selection that a leaf goes under "natural," "soft."

5. After all the objects have been placed on the tables, ask the children if they are all in the right place. If not, ask why not. Where should the misplaced object go? Why should it go there?

Activity Two (Time: one or two 15-min. time segments.)

1. Send each child home with a note to his or her parents, asking them to be sure the child brings a "man-made" and a "natural" object to school the next day.

2. In class, ask each child to identify his or her object, and ask the other children to classify each as "natural" or "man-made." Correct mistakes by discussing characteristics particular to each category.

(NOTE: Depending on the ability of the class as a whole to classify objects correctly, the teacher might ask particular students to bring in specific items, such as fresh flowers and artificial flowers, to challenge the children's classification skills.)

Activity Three (Time: one or two 15-min. time segments for #1-4; one 15-min. time segment for #5.)

1. Ask each child to bring a magazine to class the following day.

2. Divide the class into small groups. Give each group two sheets of poster board, one labeled "natural," the other "man-made."

3. Have each child cut out a specified number of photographs from the magazine (each photograph should contain only one object, to simplify classification.)

4. Ask the children to sort the photographs into "natural" and "man-made" categories. (If there are mistakes in the sorting, initiate discussion.)

5. Once everything is properly categorized, have children paste the photos on the poster boards in a collage. The next day, ask children to discuss their particular chart in front of the entire class. Later in the year, remove the "natural" and "man-made" labels from the collages, and ask the children which collage is made of natural objects, which of man-made.

(NOTE: Those students who have demonstrated limited ability to classify objects might be asked to cut out photos of only natural or only man-made objects for a particular collage, and the teacher might sit with them to aid them in the selection of the items for that one category.)

EVALUATION INSTRUMENT

The following page contains the evaluation instrument for the Kindergarten unit. It should be administered during the first time segment of the unit, and re-administered during the last time segment.

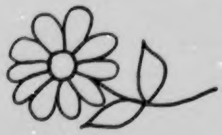
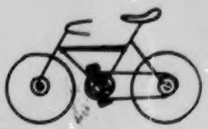
Photocopy the evaluation tool so there will be one for each student. Work out the example by reproducing it on the blackboard and circling the appropriate object.

On the test items in the first part, ask students to circle the natural object in each row.

On the test items in the second part, ask students to circle the man-made object in each row.

In each part, say the name of the picture before asking students to circle the natural or man-made object. (In the example, the teacher would ask, "Circle the natural item. Is the flower natural, or is the bicycle natural?")

NAME______________________________ CLASS______________________

EXAMPLE:  

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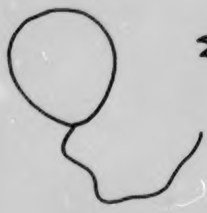
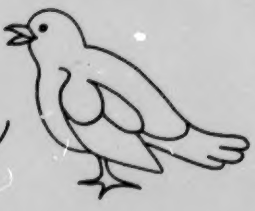
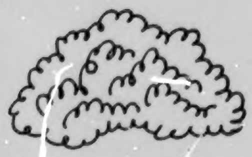
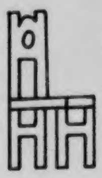
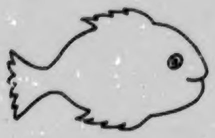
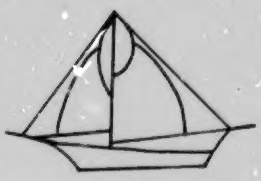
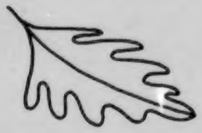
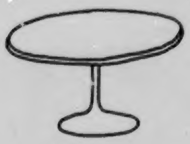
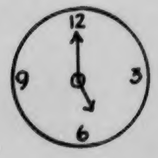
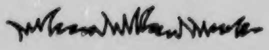
1.  

2.  

3.  

4.  

5.  

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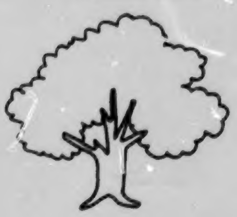
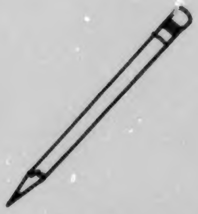
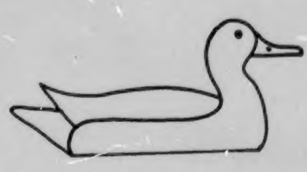
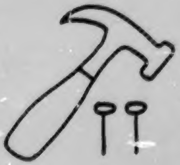
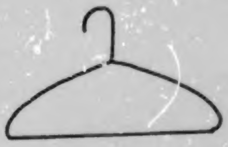
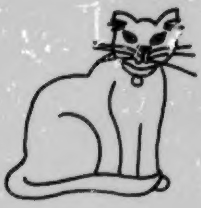
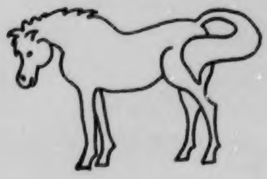
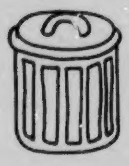
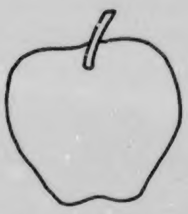
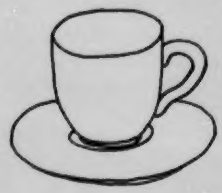
6.  

7.  

8.  

9.  

10.  

RESOURCE MATERIALS

KINDERGARTEN

A. Audio-Visual Aids

Filmstrips:

1. "Far Apart" - Demonstrates the concept of "opposite." Contact: Denoyer-Geppert Audio Visuals, New York and Chicago.

2. "Nothing Stays the Same" - Discusses change. Contact: Denoyer-Geppert Audio Visuals, New York and Chicago.

3. "Our Earth" - Basic concepts of ecology. Contact: Herbert E. Budeck Films and Slides.

Cassettes:

1. Sesame Street, Vol. III: "People in Your Neighborhood, Somebody Come and Play, Goin' for a Ride, Trash." Contact: Troll Associates.

B. Bibliography

Teacher:

1. Hamilton, Charles E. Eco: A Handbook of Classroom Ideas to Motivate the Teaching of Elementary Ecology, Educational Service, Inc.: Stewartsville, Mich. (1974).

2. Tiedt, Dr. Sidney and Dr. Iris M. "Conserving Natural Resources," October 1977 Elementary Teacher's Ideas and Materials Workshop, Parker Publishing Co.: West Nyack, N.Y., p. 9

Student:

1. Tresselt, Alvin. The Dead Tree, Parent's Magazine Press: New York (1972).

2. Wong, Herbert H. and Vessel, Matthew F. Our Tree, Addison-Wesley: Wesley, Mass. (1969).

3. Wright, Dare. Edith and Little Bear Lend a Hand, Random House: New York (1972).

KEEP AMERICA BEAUTIFUL
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A NEW SEQUENTIAL CURRICULUM
COVERING THE BEHAVIORAL ASPECTS
OF WASTE MANAGEMENT
FOR GRADES K-6

FIRST GRADE

WASTE IN PLACE

FIRST GRADE UNIT 1

1 FIRST GRADE UNIT

PURPOSE

The cumulative series of seven study units constituting the "Waste In Place" curriculum is designed to help elementary school children understand how their own habits affect the environment of their homes, schools and communities and to make them aware of the relationship between their own behavior -- and that of those around them -- and the total physical quality of life.

Solid waste is a major environmental problem in most areas of the country. Loose refuse degrades the aesthetic environment, contributes to water pollution, and is often a health hazard. Disposing of solid waste in an environmentally sound manner is becoming increasingly difficult as space for sanitary landfills runs out and pollution-free incineration becomes more costly. Resource recovery offers an excellent solution in areas where sufficient solid waste is generated to make this economically practical, but such a solution makes it even more important to insure that all waste is containerized and kept in the reclamation system.

There may be little the elementary school child can do to solve air and water pollution problems, but even a five-year-old can learn to handle refuse properly and to understand the relationship between his or her action and the quality of the environment in which he or she lives.

Essential to that understanding in the young child is learning the differences between "useful" objects and "waste" objects, and those items which have, and have not, been properly disposed of (i.e., "waste" vs. "litter").

CONCEPT

Terms such as "useful," "waste" and "litter" are important in understanding how people keep their environment clean.

OBJECTIVES

To enable each student to:

1. distinguish between five waste and five useful objects in and around the school.
2. list five circumstances under which waste becomes litter in and around the school.

3. identify three sources (locations) within the school where waste tends to become litter.

EVALUATION

Test the childrens' ability to distinguish between useful objects and those which have become waste, and their understanding of the circumstances under which "waste" becomes "litter" before initiating Learning Episode One. (The test instrument is included below, pg. 1-9.) Administer the same test after completing Learning Episode Four. Score and record individual results at the completion of each test.

TIME

Depending on the classroom structure, the teacher, and the speed with which students learn the various concepts, this unit should take between 16 and 19 time segments, each lasting between 15 and 25 min., with the exception of the last portion of Learning Episode Three, an outside activity, which will take approximately one hour. Teachers should adapt the unit to meet the needs of their particular class. The first day's time segment and the last day's time segment will be devoted to administering the evaluation instrument.

VOCABULARY

CONTAINER -	something that holds something else -- a box, a trash can, an eggshell, a bottle, a garbage truck.
DISPOSE -	to get rid of waste -- properly, by putting it into a proper container for collection and final processing by burying, burning or recovery of the resources it contains.
LITTER -	man-made or man-used waste that is put in the wrong place or has been allowed to escape from a container.
MAN-MADE -	anything made by people or machines - clothes, books, cakes, milk cartons, desks, etc.
NATURAL -	anything in our world that is not made by people - leaves, trees, rocks, birds, fruit, milk ("things found in nature")
NATURAL - (ORGANIC) WASTE	things not made by people that cannot be used any more -- eggshells, sticks, dead flowers and leaves, grass clippings, etc.
TRASH -	a synonym for waste.
USEFUL -	if a thing is useful, it helps us do something; it makes a job easier to do, or it aids us in some way. A useful object may be made by people, machines or nature.
WASTE -	anything that cannot be used anymore - orange peels, dead leaves, empty packages, coffee grounds, empty cans, broken furniture, etc.

LEARNING EPISODE ONE

Skills and Learning Activities:

Oral language use for defining, answering questions, applying definition to objects observed in the classroom. Extending definition to objects at home: reproducing objects from memory. Reinforcement by discussion: differentiating between useful objects made by people and machines and useful natural objects. Defining "waste" by process of deductive reasoning.

Materials:
-paper and crayons
-crackers, milk, straws, vegetable snacks, etc.

Activity One (Time: two or three time segments, each approximately 15-min.)

Initiate a brief discussion about the term "useful":

1. Does anyone know what the word "useful" means?

2. Have children look around classroom for useful objects, and tell why various objects are useful. (Examples: desks, books, lights, crayons, pencils, paper, chalkboard, doors, etc.) Ask: how does the object help you?

Art Activity:

3. Have each child draw and color three useful objects they have at home. Put drawings up around the room and ask children to identify what they see, and tell how each object is useful.

Further Discussion:

4. Ask children to look outside (or think about some place outside), and see if they can think of any useful natural objects. Example: a tree is a natural object -- it is not made by people. How does it help us? In what ways does it help birds and animals?

Activity Two (Time: one time segment, approximately 20-25 min.)

Defining "waste."

1. At morning snack time, or other special time, pass out crackers (or vegetable snacks) wrapped in clear plastic ... perhaps also milk and straws. As children unwrap and eat crackers and drink milk, ask: How is each object useful ... how does it help people? Do some of these objects stop being useful?

2. Although the paper, boxes or other material that things are wrapped in may be useful to protect food or keep things clean, what happens to them when the milk and crackers are gone? (They have no use any more, and they should be thrown away. Then they are called WASTE materials.)

3. What will happen to something useful after it becomes waste? Hold up a piece of clear wrap, a straw wrapper and a milk carton. Ask children what they do with these objects after they finish using them. Do they take them home, or do they "throw them away" somewhere? Where do they throw them? (in the waste basket) Pass the waste basket around so children can put their objects in.

4. Continue with brief discussion of other objects that become waste in a short period of time. Compare them with others that last a long time, but eventually outlive their usefulness. (Examples of long-lasting objects: desk, house, blackboard, erasers, scissors, cars, trains, etc. Examples of short-term objects: drawing paper, pencils, sandwich bags, straw wrappers, milk containers, etc.)

Carry-over Assignment

Ask the children to bring in two pictures from magazines and/or newspapers showing objects that will become waste over a long period of time; also two pictures of objects that will become waste over a short period of time.

LEARNING EPISODE TWO: LITTER

Skills and Learning Activities

Oral language: identifying pictures brought from home; answering questions to learn definition. Applying knowledge by observation. Classifying objects seen. Applying definition to objects seen in another area.

Activity (Time: two or three time segments, approximately 15-min. each.)

1. Refresh children's understanding of "useful" objects and how they become waste, by having them show and tell about the pictures they brought from home. As an ongoing activity, have two committees volunteer to construct two collages or murals from the pictures -- one mural showing objects lasting a long time, one showing those lasting a short time, before becoming waste. Have the class decide on titles for the collages.

2. Introduce the definition of "litter" by the following questions:

   a. Suppose someone was drawing a picture but accidentally spilled some paint on it and spoiled it. He decided he didn't want the picture any more: what would he do with it?

      If he didn't put it in the waste can, but threw it on the floor, what would it be called? (Discuss several of the terms children use until they -- or you -- use the term "litter.")

b. Definition: Litter is any waste object, made or used by people, that is not properly "thrown away" -- that is, put in the right waste basket or other container. When we don't put waste materials away in the right place, or if we let waste materials get out of the container, then that waste becomes litter.

c. Ask: what do you think litter is? Consider all responses, then explain, using above definition, how waste becomes litter.

d. Suggest that children take the next few minutes to look outside the classroom to see if they can identify something that is litter and not just waste.

e. When children give examples of litter, list them on board under appropriate headings. Make drawings of each object if possible. (possible responses: broken umbrella on sidewalk, newspaper on ground. Paper in the wastebasket ... wrong; that would be just waste since it was properly disposed of ... If the can was full and you threw a piece of paper into it and it fell to the ground, then it would be litter.)

After-school Activity

Ask children, on their way home, to look for litter on the street, and also try to find where it should have been put so that it couldn't be called "litter."

LEARNING EPISODE THREE

Skills and Learning Activity

Recollecting what had been observed; reporting and describing. Understanding difference between two terms by using criteria of location. Experiencing putting waste in proper place and picking up litter. Choosing classroom objects to fit categories "natural" and "people-made" (man-made.) Seeing and feeling natural waste. Applying knowledge visually through art. Making an object connected with the topic. Reading maps and correctly interpreting symbols to match real locations. Using two or more symbols to represent concepts of waste and litter. Using deductive reasoning to decide why litter appears in certain places.

Reinforcement of previous learning

Ask children to report on what litter they saw ("After-school Activity," above), and what kind of containers the litter should have been put into.

Activity (Time: two time segments, approximately 15-20 min. each)

1. Hold up a used piece of paper, crumple it and throw it on the floor. Ask: What is it called? Then pick it up and throw it in the trash can and ask: Now what is it called?

2. Pass out some used class papers (or used newspapers) to the class. Have each child tear up his sheet into bits and take them to the waste can and drop them in, holding arms at shoulder height. What are the pieces called that don't go in the can? What are the others called that do go in the can? Appoint a Mister Litter, or a Miss Litter, to sweep up the bits that are left on the floor after the activity. Discuss briefly how litter on the floor affects the appearance of the classroom.

3. Set up a table with a few examples of "natural" and "people-made" (man-made) wastes. Ask children to suggest and supply others from the classroom.

4. Explain "natural" waste: Leaves fall from the trees onto the ground; but they are not litter. Nature does not litter, since everything is useful in nature ... the leaves turn into a substance that helps the soil when they rot on the ground. Refer to science materials to explain the ecosystem in a forest, for example, or the chain of life that all natural living things are part of.

   Only people make litter ... by not putting things in the right place when they throw them away. To illustrate: pick up object from table, and ask: If this were in the gutter, would it be waste or litter?

Creative Activity (Time: two time segments, approximately 20-min. each)

Using pieces of cloth, plastic, or paper, have children make their own litter bags. Sides of bag may be glued or sewn together using heavy yarn and large blunt needle. Children may decorate each with their own design showing objects or activities about litter or waste. Attach string handle to each side of bag if desired.

Outside Activity (Time: one time segment, approximately 60-min.)

Preparation: Provide children with maps of the school block or area, showing building and area landmarks, such as street signs, stop lights, trees, stores, etc.

1. Go over the map in class, putting a large version of map on chalkboard, explaining symbols, etc.

2. Take children outside to go on a "litter walk," each taking his litter bag. Instruct children as follows: If you see any trash cans while you are walking, mark them with a circle on your map; if you see any litter, mark it with an X on the map. Have parents, teacher-aides or upperclass students assist you in the walk, helping children put symbols in the right places.

3. Have children pick up small bits of litter and put in bags. Suggest that they mark a black dot on their maps where they picked up the litter.

4. On return from walk, take children to area outside cafeteria, or anyplace where waste is stored. Explain that if waste cans are left open, some waste may blow away. When it blows away, it becomes litter. Have children mark their maps if litter is found outside the cafeteria.

5. In class, with the large map on the board, ask children to put all the circles and X's from their maps onto the big map. There should be marks all over the map. If there is a dense cluster of X's, point this out to the class: Here, there seems to be lots and lots of litter.

   What do you think there is in that area that would cause so much litter? (Examples: overflowing trash cans may be found at a bus stop, or a candy store, etc.) What is the reason? Litter is usually found where there are a lot of people and activity. Another reason? There may be no trash cans, or loosely stacked trash, or no covers on the cans.

6. Have children look at the map and count the number of trash cans they found. Are these cans near the littered spots? If so, why is there litter there? What can be done to cut down on litter in that area? (Put in more trash cans, and use them.) Do you think some of the litter has been blown or carried from somewhere else? How has litter been held there ... is it near a fence, or under some bushes?

LEARNING EPISODE FOUR

Skills and Learning Activity

Observing additional sites where litter may collect. Recalling rules, reviewing attitudes towards rules. Suggesting additional rules. Making suggestions for further action to achieve desired end. Reinforcing concepts through recollection. Grouping ideas to communicate effectively. Presenting ideas visually through posters. Taking responsible actions to help apply school rules. Carrying out a task over a long-term period.

Activity (Time: two time segments, each approximately 15-min.)

Arrange a tour of the cafeteria before lunch hour. Have children observe the food service, and the disposal areas, then seat them at a table, and ask such questions as:

1. Where are the waste cans? What condition are they in? Are they near to the tables? How do you dispose of your trays and other materials after you have finished eating? Are there waste cans in the surrounding areas? Could the looks of the waste cans be improved in any way?

2. Discuss the rules: Do we have a rule for throwing our waste away in the cafeteria? If we do, does it work well? Let's come back again after lunch and see.

3. Return to cafeteria directly after lunch; observe again. If possible, arrange beforehand to talk to some of the people who work there, serving and cleaning up, getting their ideas on the situation. Possible questions: Does someone else clean up after us? What should we do to clean up after ourselves? What happens if we do not follow the rules and no one else cleans up after us? How could we deal with children who do not clean up after themselves after eating? (Perhaps ask them to be responsible for the cleanliness of an area for a week, etc.)

   Let's go back to the classroom and see if we can figure out a way to help.

Alternative Activity (especially for schools without central cafeterias) - Ask the school's janitor to visit the classroom and explain rules about handling trash. He might take students to area where trash is stored for collection, and point out how better handling of waste by everyone keeps the school clean, and makes his job easier.

Culminating Activity - Planning and carrying out a "Clean School" poster campaign. (Time: two or three time segments, each approximately 20-min. each)

1. Following the cafeteria tour, ask the children what kinds of posters would help other children understand how to keep waste from becoming litter. Elicit answers such as "draw a picture of a child putting the lid on a garbage can," or "show someone pushing down the papers in the waste basket to keep it from overflowing."

2. Put the map used in Learning Episode Three up in the front of the room. Ask children to think about posters which might illustrate some of the things they learned on their "litter walk."

3. Divide the class into small groups. Ask each group to decide what kind of a poster it wants to make. What will the poster look like? What will it say? What materials will the children need to make their poster?

4. Have the children make the posters they have decided on. Hang them up around the classroom.

5. Ask the children which posters go together to make the ideas clearer and stronger. Ask them where each group of posters should be hung in the school. Make a list of those places on the board.

6. Have the children select a small committee to ask the principal for permission to put the posters up at the selected sites.

EVALUATION INSTRUMENT

The following pages contain the evaluation instrument for the First Grade unit. It should be administered during the first time segment of the unit, and re-administered during the last time segment.

Photocopy the evaluation tool so there will be one for each student. Work out the example for each part by reproducing it on the blackboard and marking it appropriately. (Staple the pages of the evaluation instrument together.)

Preparation:

Set up table containing six "useful" objects and five "waste" objects.

Instructions:

Part 1 - Identify one of the "useful" objects as the example. Identify it by name, and ask students whether it is "useful" or "waste." Once they identify which it is, instruct them to circle the person. If people can use an item, circle the person. If the item would be thrown away, circle the trash can. Continue this process for the five remaining "useful" objects and the five "waste" objects.

Part 2 - Ask the class: Would it be a good thing to knock over a trash can? Would it create litter? Would it make people happy? Once a "no" is solicited as the answer to the last question, ask students to circle the unhappy face as the example, and remark "That would make us unhappy, because it would create litter." Ask students to circle the happy face if each of these is a good way to handle waste, or the unhappy face if it's a bad way:

11. throwing a milk carton on the floor
12. throwing a milk carton into a trash can
13. picking up paper after someone else dropped it and putting it into a trash can
14. leaving a garbage can uncovered on a windy day
15. having no rule in the cafeteria for cleaning up
16. placing more trash in a container than it can hold, letting the waste fall out
17. taking away all the trash cans in the cafeteria
18. making sure that a trash can is well-covered

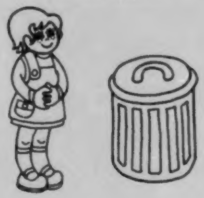
Part 3 - Ask the class: Would we find litter, or no litter, in the sky? Once a "no" is solicited, ask students to circle "no litter" as the example. Instruct them to circle "litter" if we might find litter at the places listed below, and to circle "no litter" if we wouldn't.

19. in the classroom window
20. in the school corridor
21. in the ceiling light
22. in the cafeteria
23. inside a trash can
24. near a trash can, on the floor

NAME______________________________ CLASS____________________

PART ONE

EXAMPLE:



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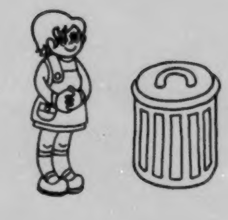

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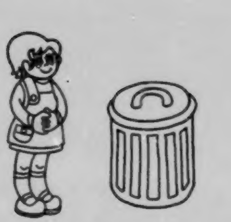

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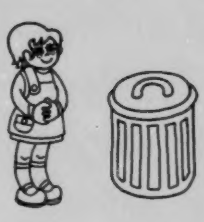

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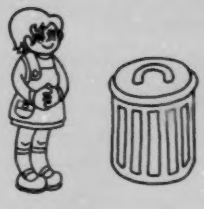

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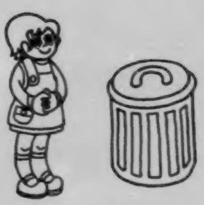

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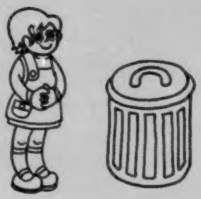

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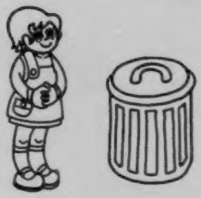

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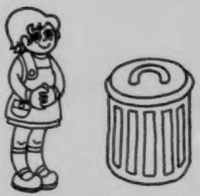

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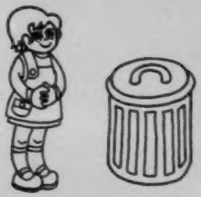

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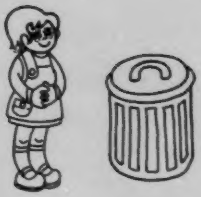
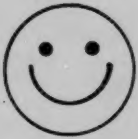
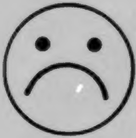


PART TWO

EXAMPLE:  

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PART THREE

EXAMPLE: LITTER NO LITTER

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20. LITTER NO LITTER

21. LITTER NO LITTER

22. LITTER NO LITTER

23. LITTER NO LITTER

24. LITTER NO LITTER

RESOURCE MATERIALS

FIRST GRADE

A. Audio-Visual Aids

Filmloop:

1. "The Trash Problem," Contact: Ealing Film-Loops, Cambridge, Mass.

Films:

1. "The Litter Monster" (15 min.) Encourages young people to look around themselves and see what they can do about litter spoiling our environment. Contact: Association Instructional Materials, New York (rental); Alfred Higgins Productions, Inc., Los Angeles (purchase).
2. "Forest Murmurs" (8½ min.) The film reminds the viewer of his responsibility for the problem of littering, showing a place of great natural beauty being ruined by carelessness. Contact: Perennial Education, Northfield, Ill.
3. "Litterbug" (10 min.) When a teacher shows a film about the beauty of uncluttered landscape, as contrasted with the ugliness and danger of littered areas, Lyle is impressed with the lesson and becomes determined to stop being a litterer. Contact: Bureau of Audiovisual Services, University of Arizona, Tucson.
4. "Let's Help Recycle" (11 min.) Children present solutions for recycling problems in their community for the city council as an illustration of what children can do about recycling wastes. Contact: ACI Media, Inc., New York.

B. Bibliography

Teacher:

1. Hamilton, Charles E. Eco: A Handbook of Classroom Ideas to Motivate the Teaching of Elementary Ecology, Educational Service, Inc.: Stewartsville, Mich. (1974).
2. MacKenzie, Joy, and Forte, Imogene. Kid's Stuff: Social Studies, Incentive Publications: Nashville (1976).

Student:

1. Harris, Joanna Chochrane. Let's Go to a Sanitation Department, G. P. Putnam's Sons: New York (1972).
2. Harwood, Pearl Augusta. The Rummage Sale of Mr. and Mrs. Bumba, Lerner Publications Company: Minneapolis (1971).

3. Hoff, Syd. The Litter Knight, McGraw-Hill Book Company: New York (1970).

4. Laurence, Ester Hauser. B-9, The Hungry Metal Eater, Rand McNally: New York (1972).

5. Miles, Betty. Save the Earth: An Ecology Handbook for Kids, Alfred Knopf: New York (1974).

6. Peet, Bill. The Wump World, Houghton Mifflin Company: Boston (1970).

7. Poulet, Virginia. Blue Bug's Beach Party, Children's Press: Chicago (1975).

8. Smaridge, Norah. Litterbugs Come in Every Size, Western Publishing Company: Racine, Wisc. (1972).

9. Zion, Gene. Dear Garbage Man, Harper and Row: New York (1957).

KEEP AMERICA BEAUTIFUL

Keep America Beautiful, Inc.

A NEW SEQUENTIAL CURRICULUM COVERING THE BEHAVIORAL ASPECTS OF WASTE MANAGEMENT FOR GRADES K-6

WASTE IN PLACE

2

SECOND GRADE UNIT

SECOND GRADE

2

SECOND GRADE UNIT

PURPOSE

The cumulative series of seven study units constituting the "Waste In Place" curriculum is designed to help elementary school children understand how their own habits affect the environment of their homes, schools and communities and to make them aware of the relationship between their own behavior -- and that of those around them -- and the total physical quality of life.

Solid waste is a major environmental problem in most areas of the country. Loose refuse degrades the aesthetic environment, contributes to water pollution, and is often a health hazard. Disposing of solid waste in an environmentally sound manner is becoming increasingly difficult as space for sanitary landfills runs out and pollution-free incineration becomes more costly. Resource recovery offers an excellent solution in areas where sufficient solid waste is generated to make this economically practical, but such a solution makes it even more important to insure that all waste is containerized and kept in the reclamation system.

There may be little the elementary school child can do to solve air and water pollution problems, but even a five-year-old can learn to handle refuse properly and to understand the relationship between his or her action and the quality of the environment in which he or she lives.

One way to increase that understanding is for students to experience, directly, the effects of a poor physical environment on their own attitudes and habits.

CONCEPT

Physical conditions, such as littering in the classroom, influence the behavior, attitudes and work habits of students and teachers.

OBJECTIVES

To enable participating students to:

1. differentiate between items which are containers and those which are not.
2. distinguish between situations involving litter which most people would like to see and those which they would not.

3. identify five things children can do to improve their home environment.
4. choose which of two pictures shows litter.
5. describe their own feelings about the effects of a littered environment.

EVALUATION

Test the students' understanding of the concept of containerization, the impact of uncontainerized trash on the individual and how an individual can improve the environment around him or her before initiating Learning Episode One. (The test instrument is included below, pg. 2-10.) Administer the same test after completing Learning Episode Three. Score and record each student's results at the completion of each test.

TIME

Depending on the classroom structure, the teacher, and the speed with which students learn the various concepts, this unit should take nine time segments, each between 20 and 30 min., spread over several weeks, and -- for Learning Episode Four -- time as needed.

Schedule:

First administration of Evaluation Instrument - Tuesday
Learning Episode One, Activity One - Wednesday
Learning Episode One, Activity Two - Thursday
Learning Episode Two, Activity One - Friday
Learning Episode Two, Activity Two - Monday morning
Learning Episode Three, Activity One - Monday morning one week later
Learning Episode Three, Activity Two - that Monday afternoon
Second administration of Evaluation Instrument - Tuesday
Learning Episode Four - several weeks later and time as needed

VOCABULARY

CONTAINER	- something that holds something else -- a box, a trash can, an eggshell, a bottle, a garbage truck.
DISPOSE	- to get rid of waste -- properly, by putting it into a proper container for collection and final processing by burying, burning or recovery of the resources it contains.
ENVIRONMENT	- your surroundings, inside or out of doors.
GARBAGE CAN	- large covered container used to store household waste until it is collected.
LITTER	- man-made or man-used waste that is put in the wrong place or has been allowed to escape from a container.
LITTER BASKET	- a container, usually used outdoors, on sidewalks, in parks, for disposing of small waste items.

LITTERING - making an area untidy because you fail to store or carry waste properly.

SOLID WASTE - all useless, discarded or unwanted solid materials.

WASTE BASKET - small container, usually used indoors, for disposing of small waste items.

LEARNING EPISODE ONE

Skills and Learning Activities

Oral language use, exploring definition of new words. Applying definition to objects at random; choosing items to fit definition.

Activity One (Time: one 25-min. time segment)

1. Have the following objects (or others) on the table for the class to see: purse, waste can, box of chalk, lunch box, salt shaker, sewing basket, toothpaste tube, shampoo bottle.
2. Ask the class what all the objects have in common. (All are containers.) Place the term "container" on the blackboard and define it.
3. Discuss the characteristics each of these containers have: size, shape, how much it holds, movability, sturdiness, way in which contained materials enter it, etc.
4. Discuss:
   - (a) Is this classroom a container? (Yes.)
   - (b) If so, what does it contain? (Books, desks, children, teacher, etc.)
   - (c) If we look around the classroom, what are some small things in the classroom that are containers? (Aquarium, box of pencils, clothes closet, desk drawers, etc.)

Activity Two (Time: one 20-min. time segment)

1. Play a "clue game" -- "what kind of container is this?..." Give a few sample clues (below) before asking the students to make up their own clues:
   - (a) "I am thinking of a container that holds your books and supplies." (Desk)
   - (b) "I am thinking of a container that holds fish." (Aquarium)
2. Review (or teach) the definitions of "useful" and "waste" from the First Grade "Waste In Place" unit:

USEFUL - If a thing is useful, it helps us do something; it makes a job easier to do, or it aids us in some way. A useful object may be made by people, machines or nature.

WASTE - Anything that cannot be used any more - orange peels, dead leaves, empty packages, coffee grounds, empty cans, broken furniture, etc.

Carry-over Assignment

1. Ask children to pick up, on their way home, something they think is a container; bring it to class tomorrow and tell what they think it contains or might have contained.
2. Ask them, also, to notice anything that is meant to contain waste and to observe if any waste has fallen out of that container.

LEARNING EPISODE TWO

Skills and Learning Activities

Review of terms and vocabulary. Observation of many items, classifying by use. Experiencing concept that various containers hold differing amounts of materials, using deductive reasoning to predict outcomes. Role-playing, following rules. Reacting to new stimuli. Carrying on regular routines under new and changed rules and environment. Experiencing new restrictions or freedoms in behavior.

Preparation and materials: Before introducing this unit to the class, inform the principal and custodian that one side of the classroom will NOT be kept clean for six days, and should be left as it is. Obtain large cardboard or plywood sheets, about 3' high, to be used to divide the classroom in two equal sections. Plan or find out how to construct a rigid barrier with them.

IMPORTANT NOTE TO TEACHERS: The remaining Learning Episodes will need to be adjusted to an open classroom situation in which students will be moving about and regrouping frequently during the week. It is important that students remain in the assigned areas during the activity.

Activity One (Time: one 30-min. time segment)

Materials: several boxes and jars of various sizes (two boxes must be the same size)

1. Discuss with children the containers they brought with them and display them on a side table. Ask children to help you find out how much some different containers can hold.

2. Have several boxes and jars at hand, of differing sizes. Have children fill 3 different sizes of jars with the same amount of sand (one may be half full, one may be totally full, one may be overflowing). Have other children fill a box with loosely-balled used papers, making sure to count sheets; have others fill a second box (same size) with smooth sheets, also counting sheets. Ask the group to estimate how many paper balls would fit into other boxes, based upon these observations. Test out their hypotheses by actually filling the other containers.

3. Point out that the class has already learned that when things are no longer useful*, they become waste*. Useful and waste materials may be either natural* or man-made*. Tell them that all useless, discarded or unwanted solid materials (like paper, garbage, old clothes, etc.) are called solid waste*. If solid waste is not disposed* of in a container, it becomes litter*.

   *-Teacher may wish to review definitions of these terms.

   Ask children if they saw any waste containers on their way home the day before. Was there waste on the ground around these containers? Can they think of three more kinds of containers used to store solid waste materials in your town or city? Establish the following as terms they should know: WASTE BASKET, LITTER BASKETS, GARBAGE CAN. (See vocabulary at beginning of unit if necessary.)

4. Ask children again if they saw any waste containers on their way home the day before. Make a list of their answers on the board. Ask again if there was waste on the ground around or near these containers. Put an X by the kind of container that had loose waste around it.

5. Initiate a discussion on why there was loose waste around some of the containers. Were they too full? Were their lids open? Had they been knocked over? What is the proper way to use these containers?

6. Initiate discussion about what happens to people when they don't use their containers properly, and litter starts to accumulate? Discuss children's answers and then suggest that they try a project to find out.

Activity Two (Time: one 30-min. time segment on Monday morning)

Preparation and materials: as above (beginning of Learning Episode Two); also a waste basket half the size of the classroom's usual waste basket.

1. Have children plan and construct a barrier with the cardboard or plywood sheets, straight down the middle of the classroom, leaving an 18" doorway at some point for children to pass through. (NOTE: Plan it so that the littered area be that which is further away from the classroom door.)

2. When the barrier has been constructed, divide the class in two equal groups. Explain to the children that they are to be in either the "tidy group" or the "untidy group." Allow them to have some choice in the matter, or assign them arbitrarily, whichever fits your group best. Or let each child flip a coin to see which group he will be in.

3. Students in Group I, the Tidy Group, will be sitting in the area which is not to be littered ... Group II, the Untidy Group, will sit in the area that is to be littered. Group I is to have their desks arranged so that they face each other. Group II should set up their desks in the traditional rows.

4. Inform class: "Beginning immediately, all children in Group I near the door are in the non-littering area, and will be very careful to put their waste in the container I've placed there." (Point out a container that is half the size of the usual waste basket used in the classroom.) Continue: "The children in Group II, seated on the other side of the room, will throw their discarded paper, old pencils and any other objects we usually throw in the waste basket -- with the exception of food products and milk containers (those are to be thrown in the regular classroom waste basket) -- directly on the floor.

   "Once the half-sized waste basket in the non-littering area is full, Group I will continue to discard waste into the overflowing container until the end of the day, when they will pick up the overflowing waste from around the waste basket and place it in the 'littering' area."

IMPORTANT TEACHER NOTE: Once this project has begun, for the next six days in class, do not initiate any discussion on litter. Should children try to bring up the subject, say "we'll discuss this later on in the school year." The project should begin on a Monday morning and terminate on the afternoon of the following Monday. Near the end of the experimental period (either Friday after-school or early Monday morning), the custodian should be asked to clean up all the litter on the classroom floor and store it out of children's sight.

LEARNING EPISODE THREE

Skills and Learning Activities

Analyzing reactions and behavior. Experiencing and expressing new feelings and attitudes. Using reasoning to offer solutions to problems. Reacting to surprising changes. Math skill use in estimating container size and amounts of materials they will hold.

Preparation: Obtain six or eight waste baskets and store out of sight.

Activity One (Time: one 30-min. time segment on the Monday morning following Activity Two in Learning Exercise Two)

1. On Monday morning when this project is to be completed, discuss their experiences with Groups I and II, as follows:

2. Group I (in non-littering area)

   a. Since your area was cleaner than the other half of the class, did you find it easier to move about?

   b. How did you feel about throwing your trash onto other people's area?

   c. What could we have done on this side of the room to prevent so much trash from being passed to the other side of the room?

   (Empty the container more often, have larger container, have more containers, change untidy habits.)

3. Group II (in littering area)

   a. Since your area was heavily littered, did you find it difficult or uncomfortable to move about or to work?

   b. How do you feel about others throwing trash into your area?

   c. Can you think of any other ways to prevent trash from building up that haven't been mentioned?

4. For Both Groups

   a. Do you think your classroom looked like a nice place to work?

   b. Would a visitor think our classroom looked like a nice place to visit?

   c. Were you surprised to see the classroom clean this morning? Who do you think cleaned it? Do you think someone else should always clean up after us, or do you think we should keep our classroom clean ourselves?

   d. Was this project fun to participate in? Why or why not?

   e. If everyone in our school and community failed to put waste in the proper containers, how would the world around us look?

   f. What people do you think litter? Littering is a habit that many people have ... what is a habit? How do we go about changing our habits? Apply the ensuing discussion to the litter project.

Activity Two (Time: one 20-min. time segment on Monday afternoon, same day as Activity One, immediately above)

1. Have the children leave the room at some point during the day (possibly lunch hour), and while they are out, put the waste collected by the custodian back on the floor in the littering area. When they return, have each child write his or her name on a small slip of paper and estimate how many waste cans must be filled to clean up the room.

Collect these slips and then have all the children participate in picking up the litter, throwing it into waste baskets and counting the baskets. Then have them each take a waste basket to the proper disposal area.

2. Ask the following questions:

   a. If we used a container twice the size of an ordinary basket, how many children would have carried a basket to the waste disposal area?

   b. If we used a container such as a box four times the size of this waste basket, how many times would we have had to carry it to the disposal area?

   c. If we used a container half the size of the waste basket (such as the one we used in the non-littering area), how many children -- each carrying one container -- would have walked to the disposal area?

3. Pass out the slips of paper, and have children see if they guessed the right number of containers. Have a group of children dismantle the barrier and dispose of it properly.

IMPORTANT TEACHER NOTE: Administer the Evaluation Instrument soon after the completion of Learning Episode Three.

LEARNING EPISODE FOUR

Skills and Learning Activities

Oral language use, recalling the experience, assessing one's own behavior and reactions in retrospect. Written language, describing one's feelings. Planning and presenting a program for parents. Describing and explaining the project in terms of a new group.

Activity One (Time: one 20-min. time segment for #1; as needed for #2-3)

1. Several weeks later, ask children to comment on the experiment. Discuss how they feel about it now, and if they think they have changed any of their habits. Then ask each to write a brief story about "How I feel about the Litter Project." Tell them their names will not be mentioned, if they prefer it that way, when the papers are read aloud. The papers will be compiled as a composite record (or book) of what happened during the project. Their names may be left off the papers in the composite record if they so desire.

2. Provide positive reinforcement (stars next to their names on the bulletin board, or some other appropriate recognition) for those students who express changes in their attitudes and habits about handling trash and not

littering. Teacher may wish to provide several writing and/or speaking exercises on "How I feel about the Litter Project" or "How I feel about litter" to be sure everyone receives recognition eventually. (In the case of students who might be unwilling to speak or write about their feelings, the teacher might want to observe the child on the playground or at lunch and snack time, watch him or her properly disposing of trash, and award the recognition based on their action.)

3. Once all students have received recognition, teacher might plan some "special event," such as a tree-planting or a schoolyard cleanup (under appropriate adult supervision) or asking a city trash collector to speak to the class about his job and how people can help keep their community cleaner. (Sanitationman might be encouraged to bring his truck with him.)

Activity Two (Time: as needed)

As a summary or culminating activity, have children plan an "Our Environment" program for parents. Its purpose will be to tell parents about the project, and what the children learned by doing it. Some of their papers should also be a part of the program. At the end of the program, each child might be given the YOUNG CLEAN CITIZEN award, a shoulder patch, available from KAB.

EVALUATION INSTRUMENT

The following two pages contain the evaluation instrument for the Second Grade unit. The evaluation should be administered during the first time segment of the unit, and re-administered during the first time segment following the completion of Learning Episode Three.

Photocopy the two pages of the evaluation tool so there will be enough for each student.

On the test items in the first part, ask students to mark with an "X" the things which are containers.

On the items in the second part, ask students to mark with an "X" those things which people would like to see.

On the items in the third part, ask students to mark with an "X" those things they could do to keep their home environment clean.

The teacher might wish to read each of the items in the first three sections aloud, so students will both read and hear the item. ("Is a paper bag a container? If you think it is, mark 'X'.")

On the page of drawings, ask students to draw a line through the pictures that do not show litter.

Answers

Containers (marked "X"): paper bag, salt shaker, garbage can, glass, jar, pot

Things which people would like to see (marked "X"): pretty park
beautiful lake

Things which people would not like to see (marked "O"): overflowing trash can
paper cups and cans along side of road
picnic table covered with dirty cups and plates

Things to keep the home environment clean (marked "X"): pick up toys
rake leaves
help mother dust
hang up clothes
take out trash

Draw line through pictures that do not show litter:

upper-left: top drawing
bottom-left: bottom drawing

upper-right: bottom drawing
bottom-right: top drawing

Name____ Class______________________

A container holds something. Mark with an (x) things which are containers:

____ a paper bag
____ a salt shaker
____ a garbage can
____ a new dress
____ a window

____ a glass
____ a jar
____ a tree
____ a pot
____ a flower

Write (x) if people would like to see this
Write (o) if people would not like to see this:

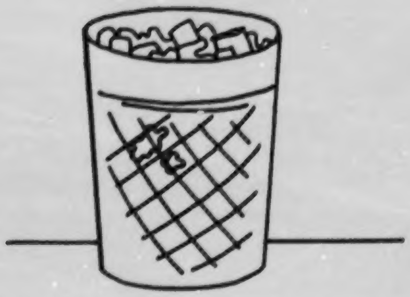
____ a pretty park with children playing
____ an overflowing trash can
____ paper cups and cans along the side of the road
____ a beautiful lake
____ a picnic table covered with dirty cups and plates

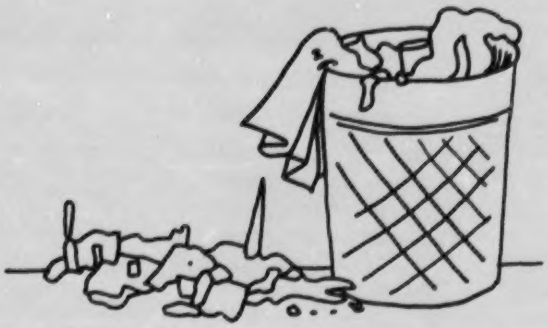
Mark with an (x) things you can do to keep your home environment clean:

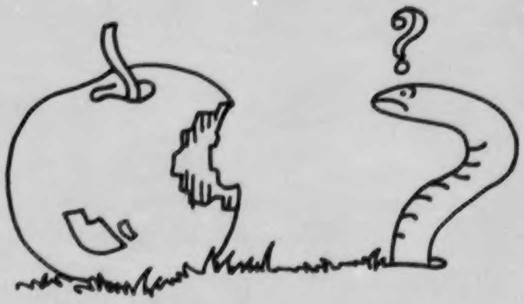
____ pick up your toys
____ rake the leaves
____ dress yourself
____ play outside
____ help mother dust

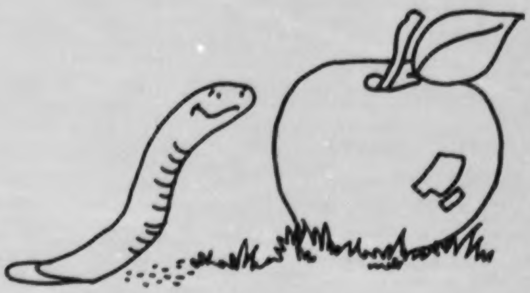
____ watch T.V.
____ hang up your clothes
____ take out the trash
____ sing a song
____ take a walk

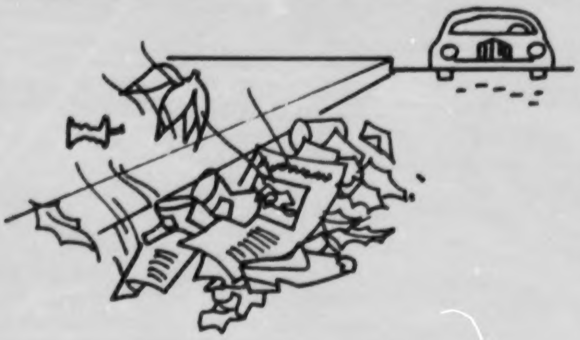
Draw a line through the pictures (next page) that do not show litter.

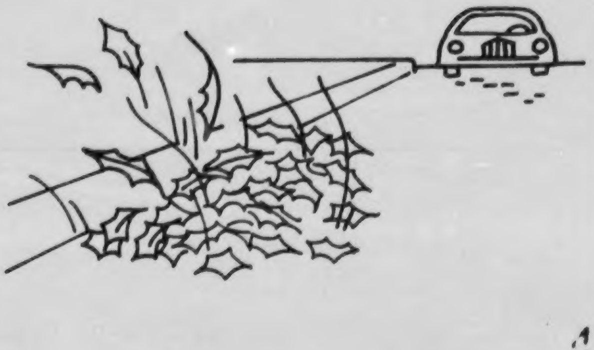


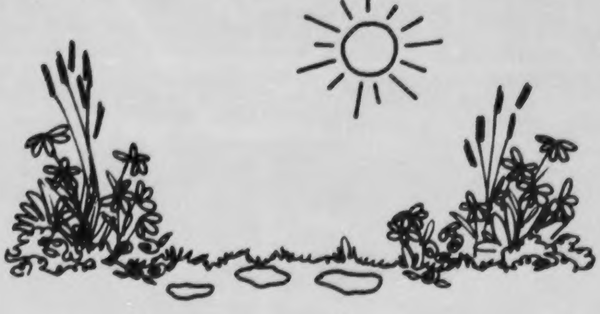


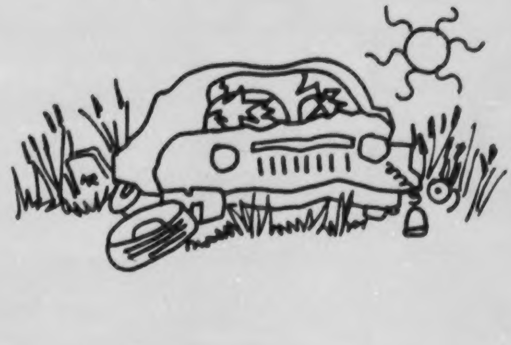












RESOURCE MATERIALS

SECOND GRADE

A. Audio-Visual Aids

Filmloop:

1. "The Trash Problem," Contact: Ealing Film-Loops, Cambridge, Mass.

Films:

1. "Meecology" (26 min.) - Portrays children from varied surroundings (rural, urban, suburban and inner city), showing how each child relates to his environment in an ecologically productive way. (Complemented by a school teaching aid called the "McDonald's Ecology Action Pack.") Contact: Modern Talking Picture Service, New York (loan); Peshak Films, Lake Forest, Ill. (purchase).

2. "The Litter Monster" (15 min.) - Encourages young people to look around themselves and see what they can do about the litter spoiling our environment. Contact: Association Instructional Materials, New York (rental); Alfred Higgins Productions, Inc., Los Angeles (purchase).

B. Bibliography

Teacher:

1. Environmental Action Coalition. It's Your Environment: Things to Think About - Things to Do, Charles Scribner's Sons: New York (1976).

2. Hilton, Suzanne. How Do They Get Rid of It?, The Westminster Press: Philadelphia (1970).

3. Marshall, James. Going to Waste, Coward, McCann and Geoghegan, Inc., New York (1972).

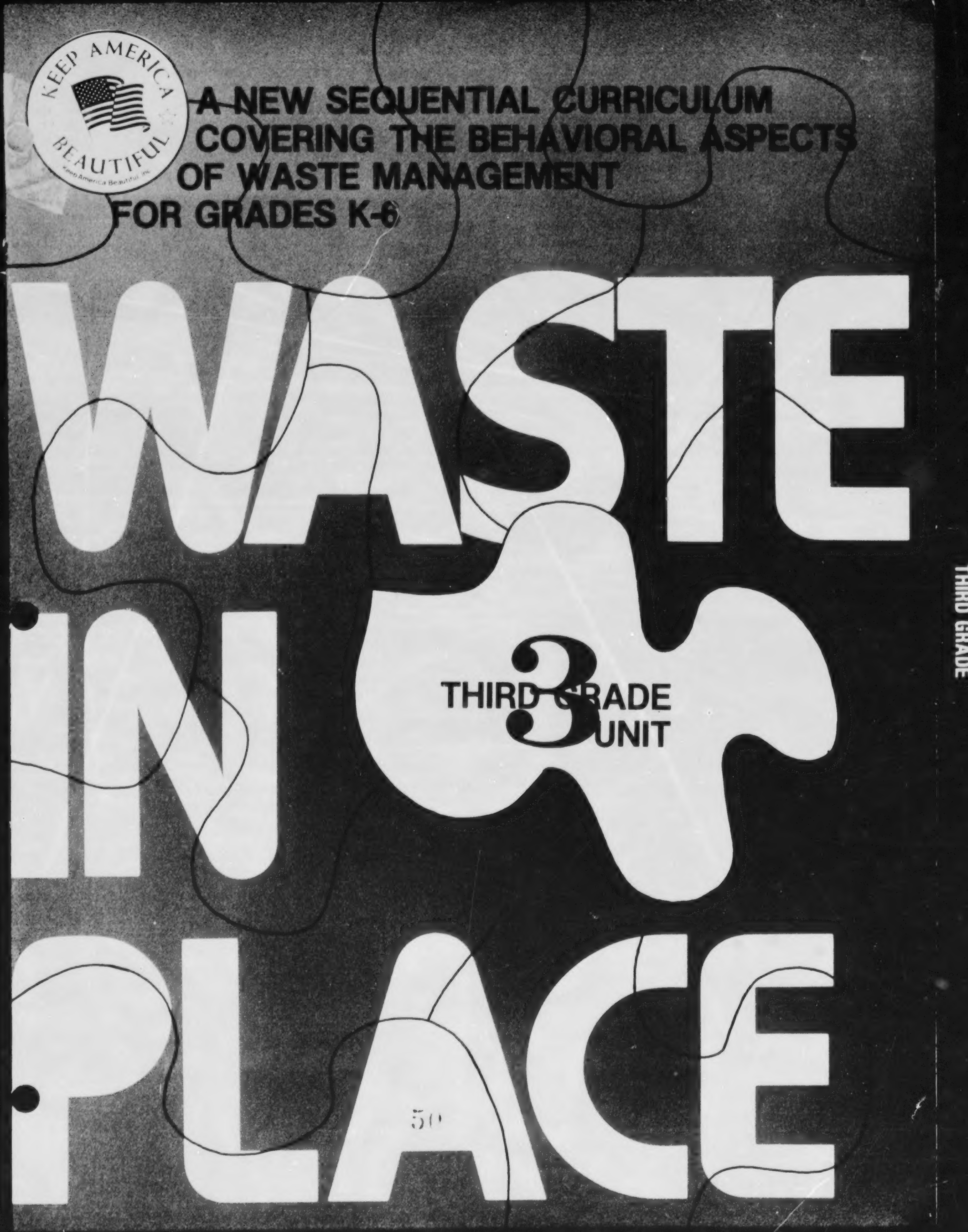
Student:

1. Leaf, Munro. Who Cares? I Do., J. B. Lippincott Company: Philadelphia (1971).

2. Shuttlesworth, Dorothy E. Litter - The Ugly Enemy, Doubleday and Company: New York (1973).

3. Simon, Seymour. Science Projects in Pollution, Holiday House: New York (1972).

4. Wright, Dare. Edith and Little Bear Lend a Hand, Random House: New York (1972).



KEEP AMERICA BEAUTIFUL

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COVERING THE BEHAVIORAL ASPECTS
OF WASTE MANAGEMENT
FOR GRADES K-6

WASTE IN PLACE

3

THIRD GRADE UNIT

THIRD GRADE

3 THIRD GRADE UNIT

PURPOSE

The cumulative series of seven study units constituting the "Waste In Place" curriculum is designed to help elementary school children understand how their own habits affect the environment of their homes, schools and communities and to make them aware of the relationship between their own behavior -- and that of those around them -- and the total physical quality of life.

Solid waste is a major environmental problem in most areas of the country. Loose refuse degrades the aesthetic environment, contributes to water pollution, and is often a health hazard. Disposing of solid waste in an environmentally sound manner is becoming increasingly difficult as space for sanitary landfills runs out and pollution-free incineration becomes more costly. Resource recovery offers an excellent solution in areas where sufficient solid waste is generated to make this economically practical, but such a solution makes it even more important to insure that all waste is containerized and kept in the reclamation system.

There may be little the elementary school child can do to solve air and water pollution problems, but even a five-year-old can learn to handle refuse properly and to understand the relationship between his or her action and the quality of the environment in which he or she lives.

As the children become more aware of this relationship, they can be brought to appreciate the unconscious motivation which underlies so much customary behavior affecting the quality of the environment -- and that by changing the situations and circumstances which influence attitudes, behavior can be changed.

CONCEPT

"Norms" influence individual behavior and affect the way people treat their environment.

OBJECTIVES

To enable each student to:

1. identify three norms influencing behavior in the classroom.
2. identify three norms influencing littering by students.

3. from among four possible reasons for a certain behavior, choose the one which demonstrates the greatest awareness of the impact a particular action has on the total physical environment.

EVALUATION

Test the students' understanding of the concepts of "norms" and "habits," and their recognition of the effect their habits and those of others have on the environment, before initiating Learning Episode One. (The test instrument is included below, pg. 3-19.) Administer the same test after completing Learning Episode Five. Score and record each student's results at the completion of each test.

TIME

Depending on the classroom structure, the teacher, and the speed with which students learn the various concepts, this unit should (with the exception of only a few units of slightly greater length) take time segments of 20-30 min. on 15 to 17 school days (including the first and last days, which are devoted to evaluation).

VOCABULARY

BEHAVIOR	- the way in which people act.
ENVIRONMENT	- your surroundings, inside or out-of-doors.
HABIT	- an action a person does over and over again without thinking about it.
LITTER	- man-made (or man-used) solid waste that is put in the wrong place or allowed to escape from a container.
LITTERING	- making an area messy because you fail to get rid of waste properly, or store it so it can't escape.
NORM	- a habit most people have that makes them tend to act in a certain way at certain times or places. Behavior that is expected, accepted, the unwritten rule.
NORMATIVE SYSTEM	- a network of norms followed by other people, which strengthen an individual habit and make it harder to change.
RECEPTACLE	- a container that is made to have things put into it. As used in this curriculum, a container for small waste items, a litter basket, waste basket.

RECYCLING	- reusing material instead of discarding it; making new materials from used ones.
SOLID WASTE	- all useless, discarded or unwanted solid materials.

LEARNING EPISODE ONE

Skills and Learning Activities

Good listening skills. Identifying aspects of personal behavior by applying newly-learned concept; forming a general definition from particulars. Observation and reporting. Oral language use.

Activity One (Time: one 25-min. time segment)

Introduce the concept of "habit" by asking:

1. Does anyone know what a habit is?
2. If no satisfactory replies are forthcoming, ask:
   a. When you brush your teeth, do you brush up and down, or sideways. Do you always brush the same way? If you do, that is a habit.
   b. If you always remember to brush your teeth before you go to bed, you have a good habit.
   c. If you always bite your nails when you are tired, you have a bad habit.
   d. Some habits, like which shoe you put on first every morning, are neither good nor bad. They just save you time, the time it would take, for example, to make up your mind which shoe to put on first every morning.
3. Ask the children to make a list of five of their own good habits. Teacher should make one, too. (Allow 10 minutes to complete list)
4. To make it less awkward for the children, the teacher should read her or his list first. (as, for example: I always get up as soon as the alarm goes off. I always take the dog out before breakfast. I always brush my teeth after breakfast, etc.)
5. Collect the lists and read some aloud, without identifying the child whose list is being read.
6. Ask if anyone can define "habit." Continue discussion until someone approaches the definition given in the vocabulary, or introduce it.
7. Hand back the lists, ask the children to keep them for another lesson in several days. (Learning Episode Two, Activity One.)

Activity Two (Time: one time segment, approx. 20-40-min.)

Preparation and materials: portion of one bulletin board for drawings (see below); sign: "Habits Too Good to Shake" with a drawing of a cheerleader holding a pom-pom; sign: "Habits We Would Like to Break," with a drawing of a balloon and a pin.

1. Pass out one large sheet of white drawing paper to each student, and ask each to fold the piece in half.

2. Have each child print "A Bad Habit" at the top of one half and "A Good Habit" at the top of the other.

3. Under each heading, each child is to draw a picture appropriate to a "good" or "bad" habit. The picture can reflect a personal habit or that of a friend or family member. (The teacher prepares one, too.) Allow 10 minutes for drawing. (The teacher should circulate among the students early on, to be sure everyone has grasped the idea of "habit.")

4. Teacher and students show pictures and explain each "good" habit and "bad" habit.

5. Have students cut out their pictures. On the bulletin board, post the pictures showing "good" habits under the heading "Habits Too Good to Shake," and those showing "bad" habits under "Habits We Would Like to Break."

Carry-over Assignment (if needed)

For Activity Three, the following will be required:

at least three frisbees
at least three playground balls or softballs
one hula hoop

If these items cannot be secured within the school system, assign students to bring an adequate number from home. (Assign a few extras, in case students forget their assignments or are absent.)

Activity Three (Time: one time segment, approx. 20-30-min.)

1. Tell the students, "We've made lists and drawn pictures of our 'good' and 'bad' habits -- some of the ones we know we have. Now we are going to find out if some of us always do the same thing in the same way without even knowing we have that habit."

2. Take the class to the playground. Divide into two groups.

3. Have a child from Group I volunteer to be the ball catcher. Ask her or him to place the hula hoop at a particular spot (far enough away from the group to make it somewhat difficult for them to reach him/her with the ball), and to stand in the hula hoop. Instruct him or her to stay within the hula hoop as she or he catches the ball. Have each of the children from Group I, in turn, throw the ball three times to the catcher.

4. Quietly, so Group I won't hear, instruct Group II to watch the throwers to notice if anyone always does the same thing, like roll the ball between his or her hand every time she or he throws the ball. Ask them to notice, too, if the catcher always does the same thing while waiting for the ball to be thrown, or after throwing it back (for example, does the catcher take two steps backwards after throwing the ball? or rock from side to side? or brush the hair on his or her forehead?).

5. Have a child from Group II volunteer to be the frisbee catcher, and repeat the instructions in steps #3 and #4, above (substituting "frisbee" for "ball"). After the two groups have had sufficient observation time, return to the classroom.

6. Point out to the children that all star athletes -- ball players and frisbee champions among them -- have habits they follow in throwing. Then ask the two groups (first all the Group I students, then those in Group II) to report the habits they observed among the ball or frisbee throwers. List them on the board. Asterisk the ones that seem to be common.

7. Ask the children to remember what the others observed about their habits.

8. Turn to the bulletin board (see Activity Two), and point out some of the good and bad habits shown there which appear to be common.

Optional Reinforcing Activity

1. After a few days, take the class out to the playground and divide into the same groups. Ask those children who were observed to act out of habit on the previous occasion if they remember what it is they usually do when throwing a ball or crossing a finishing line.

2. Have the two groups play and observe, as before.

3. Back in the classroom, note if the same habits were followed, or if, having become conscious of their behavior, children omitted the actions they performed the first time. Initiate a discussion on why a child might change a habit, once he or she became conscious of it.

4. Ask why we might wish to change some of the "Habits We Would Like to Break" found on the bulletin board.

LEARNING EPISODE TWO

Skills and Learning Activities

Tallying a group of items to form a new group. Using deductive reasoning to form a new definition. Role playing. Oral language use.

Activity One (Time: one 20-min. time segment for #1-4; one 30-min. time segment for #5-8)

1. Read the familiar story of "The Three Bears." When the story is completed, write the title "A Day in the Life of Goldilocks" on the board, list about 10 things in sequence that reflect Goldilocks' day. For example:
    1. Goldilocks arrived at the bears' cottage.
    2. Goldilocks tasted the porridge of Mama and Papa Bear.
    3. Goldilocks ate Baby Bear's porridge.
    4. Goldilocks sat on the chairs of Mama and Papa Bear.
    5. Goldilocks broke Baby Bear's chair.
    6. Goldilocks didn't like Mama or Papa Bear's bed.
    7. Goldilocks fell asleep in Baby Bear's bed.
    8. Goldilocks woke up and saw the Bear family.
    9. Goldilocks ran home.
2. Have each child write her or his own journal for the day, listing about 10 things done thus far. The list should be a sequential one, similar to the activity on the board. The teacher should make a list, also.
3. Once the lists are completed, have a volunteer read his or hers. Have other members of the class raise their hands if they have an activity in common.
4. On the board list those activities which are common or "normal" for many class members. For example:

    I ate breakfast.
    I brushed my teeth.
    I waited for the bus.
    I packed my own lunch.
    I read a story in school.
    I had morning recess.

5. Explain that the word "norm" is a short-cut or nickname word for normal. Write the word "norm" on the board.
6. Define "norm" (see vocabulary, above) and place definition on board. Look over at the "Habits We Would Like to Break" and "Habits Too Good to Shake" bulletin board. Read each habit separately. Ask each child to raise his hand if that habit applies to him. If many students find the habit true for them, draw a small cartoon balloon next to the habit indicating that it is a norm. For example:

7. To reinforce the concept of norms, have the class sit in a circle. The teacher joins the circle and brings along a list of statements. If a student thinks the statement shows a norm, he or she is to raise his or her hand. If the statement reflects an unusual way to react -- that is, not expected or not a norm, the children are not to raise their hand. For example:

    a. "Cheering for your favorite team at a football game -- is that a norm? Is it an expected way to behave?"
    b. Talking during a movie.
    c. Putting up the Christmas tree in October.
    d. Looking the other way when the doctor gives you a shot.
    e. Crying at your birthday party.
    f. Chewing on a pencil.
    g. Eating with your fingers. (N.B.: #8 and some of the examples that follow illustrate a critical fact that the teacher will want to emphasize with children -- that some norms are operable only under certain circumstances, and unacceptable in others. Eating with your fingers is usually unacceptable, unless it's fried chicken or bread or ribs, for example.)
    h. Throwing food. (Usually unacceptable, but what about the rice at weddings?)
    i. Dressing all in green (Not expected, except on St. Patrick's Day.)
    j. Applauding when someone finishes singing a song. (Usually expected, except during religious services.)

8. Have students make up their own statements, and ask the class to decide if they reflect norms. Are there circumstances under which they might not be norms? The teacher should consider encouraging discussion of norms which may differ from child to child, based on ethnic, religious or gender-related traditions (some families go to religious services on Friday night, some on Saturday night, some on Sunday morning, for example, or that some families pass their spare time on the front porch, and some in the house). Emphasize that these different norms are just that: different. They're all "right."

Activity Two (Time: one 25-min. time segment)

Preparation: construct placards (to be worn around children's necks) reading:

police officer

parent in car

senior citizen

child on bicycle

coach

cheerleader

principal

foreign exchange student

teacher

teacher next door

student

1. For these role-playing situations, set aside a certain area of your classroom as a stage.

2. Review the concept of "norm."

3. Tell the class the various volunteer actors and actresses will be performing. For each role-playing situation, the performing child should wear a placard around his neck designating the appropriate character.

4. Role-playing situation one:

   Ask four children to pretend to be someone watching a child at a street crossing. One might be a police officer; one, a parent in a car; one, a senior citizen with a cane; another child on a bicycle.

   Have each child act out what she or he would do, in that role, if the child started to cross the street on the red light.

   When the role playing is completed, ask the other children why they think those people would act that way if they saw a child start to cross the street on the red light. Was the child doing what they expected? What effect would their actions have on the child the next time he came to a crossing and the light was red?

5. Role-playing situation two:

   Have another four children pretend they are watching a group of children playing an exciting game of basketball on the playground during recess. One might be the coach; one, a cheerleader; one, the principal; and one, a foreign exchange student.

   Have each child act out what he or she would do, in that role, if the children playing basketball were absolutely silent. Emphasize the fact that the game is being played by ordinary children (not handicapped), in an appropriate place at an appropriate time.

When the role playing is completed, ask the other children why they think these people watching the game would act that way. Is it "normal" for ordinary children to play an exciting game without making a sound? What effect would the actions of the coach, the cheerleader, etc., have on the children the next time they played basketball?

6. Role-playing situation three:

   Have another four children pretend they are watching a class where the teacher has just asked if anyone knew the answer to a question. One might pretend to be the teacher; another, the teacher in the next room; one, the principal, who was walking by the classroom; and one, a student in the class who knew the answer.

   Have each child act out what she or he would do, in that role, if all the children just yelled out the answer and no hands were raised.

   When the role playing is completed, ask the other children why they think those people would act that way. Is everyone yelling at once accepted behavior in the classroom, or is it an unwritten (maybe even a written) rule to raise your hand in class? What effect would the teachers' and principal's actions have on the class, the next time a question was asked?

7. After a big round of applause for classroom actors and actresses, explain that crossing the street when the light is green, yelling at games, raising your hand to answer a question are "norms," habits most of us share because we are expected to act in a certain way under certain circumstances. The parent in the car expects us to wait for a green light, so he can drive down the street without worrying about hitting us. Yelling at games is accepted -- everyone thinks it is all right. Raising your hand in class is a rule, even if it isn't written down, even if no one ever said you had to. It's a custom in almost every school.

8. Tell the class to think about certain ways they act in school. Promise them that they will be experimenting with "S.N.'s" next time. (An S.N. is a school norm -- keep the meaning of the initials a surprise until the next lesson.)

LEARNING EPISODE THREE

Skills and Learning Activities

Expanding a definition by adding particulars, making deductions from observation; logical analysis, organizing concepts into a system, observing and reporting; writing reports.

Preparation: write the following statements on separate pieces of paper:

This afternoon, we will have a big math test.

Let's all take a three-minute rest at our desks.

How many would like to have the afternoon off from school?

If the students whose desks are messy don't get them cleaned up by the time I count 20, the whole class will stay after school.

If the class were in the gym, and we saw one player kick and hurt another player, how would we let him know we disapproved of his behavior?

Get ready to go out for recess.

(Include other statements that have application to the particular class or school.)

Activity One (Time: one 20-min. time segment)

1. Remind the class that the mystery initials are "S.N." place them on the board.
2. Explain that the class has been thinking about norms. Say that today they are going to experiment with norms in school. Then ask what they think "S.N.'s" are. (They are school norms.)
3. Ask the class to list some school norms, things they are expected to do while in class. List these on the board. Ideas may include:

   Hanging coats properly.
   Being quiet while others speak.
   Placing names on papers.
   Wearing sneakers to gym.
   Cleaning up bathroom sinks.
   Throwing paper or trash in the waste basket.
   Sitting at your own seat.
4. Put previously prepared statements in a basket. Pass it to the children and let each child pick one out.
5. Ask one child to go to the blackboard and notice how the class reacts when each statement is read. (He or she may wish to write down reactions.)
6. Have children read the statements they have selected.
7. After the statement is read and the reactions are noticed, the card can be taped to the board with the watcher's comments placed next to it. For example:

This afternoon,
we will have
a big math test.

made faces
groaning
open mouths in surprise
looked at friends

8. Explain that most of the reactions seen by the watchers were "norms," habits we all have, ways of acting shared by everybody. Norms tend to go together, to depend on one another, to be part of a system. A lot of people get in the habit of doing something a certain way and a whole lot of habits grow up around that habit, to make it even stronger in all of us -- a norm is often supported by a network of other norms. There are networks of norms that support S.N.'s, too.

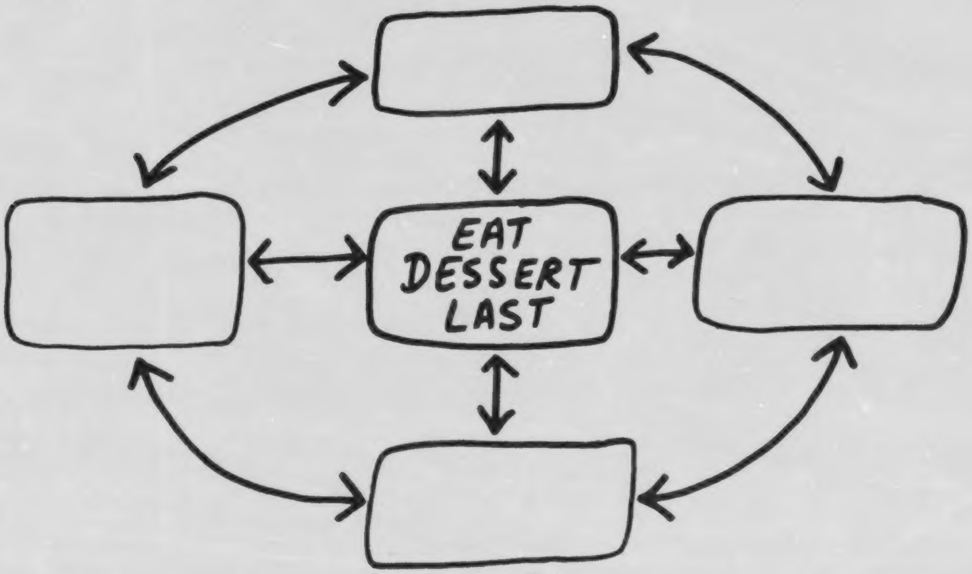
Activity Two (Time: one 20-min. time segment)

Remind the children that yesterday we established that there are networks of norms that support other norms. For example:

a. When do you eat dessert, before your meat and vegetables or afterward?

b. Do you know why we usually have dessert at the end of a meal? Back in the Middle Ages, in the days of knights in armor, it was the norm to have sweets -- cakes and candy and pudding -- all through the meal, but most Americans save dessert until last.

c. Draw the diagram below on the board. Put four or more boxes at equal intervals on the circle; write "eat dessert last" in a box in the center of the circle:



d. There is a normative system that keeps eating dessert last a habit for us. A "normative system" is one of these networks of norms. (Write "normative system" above the circle.) Can you tell me what other habits keep this habit, this norm, strong?

Sample responses:

1. Mother serves dessert at the end of the meal.
2. In many families, children are not allowed to have dessert unless they have finished their vegetables.
3. In most school cafeterias, dessert is at the end of the serving line, the last thing that is put on the tray.
4. In restaurants, dessert is listed at the end of the menu.

e. As other norms are mentioned (or introduced by the teacher), write them in the boxes on the circle.

f. When all the boxes are filled in, read them aloud, right around the circle. Ask the children if they see how these habits (norms) go together, to make each other stronger, to make a system where each depends, to some degree, on the others.

Activity Three (Time: one time segment of variable length, depending on circumstances)

When we go to the cafeteria for lunch today, let's see if we can observe a normative system that is working in our school. (In smaller schools without cafeterias, or for schools in split-session, teachers may wish to modify the second example to in-class use, or use the third example, marked *.)

Sample normative systems that operate in many schools (modify as necessary):

Norm - we always form a line to the right when going to the cafeteria, even when there is no rule or expressed school policy requiring it.

Supporting Norms

a. A good teacher controls her or his class. Children are easier to control when they are in an orderly line. Therefore, teachers tend to steer children into lines.

b. Some children are in the habit of acting as teacher's helper. These children tend to admonish their classmates if they step out of line.

c. Young children tend to follow the example of older ones. Kindergarteners form the habit of lining up in corridors as soon as they start school.

d. In America, pedestrians as well as motorists tend to stay to the right.

e. It is considered bad manners to push ahead of others.

Norm - in the cafeteria, we put our napkins in our laps, even though most paper napkins supplied in schools are too small and thin to protect clothes from spills.

Supporting Norms

a. It is not proper -- or sanitary -- to use someone else's napkin to wipe your mouth. If you keep your napkin on your lap, it won't get mixed up with other people's.

b. The napkins used at home are usually heavy enough to protect clothes from spills, so our mothers have a good reason to tell us to put our napkins in our laps.

c. Napkins left on the table look messy. Most of us were taught in our high chairs that our surroundings must be clean when we eat.

d. Many teachers encourage the habit because they are parents and are used to telling their own children "Put your napkin in your lap."

*Norm - we always raise our hands when we want to be recognized in class.

Supporting Norms

a. Then the teacher recognizes us.

b. If everyone just started talking at once, no one would hear anyone.

c. In America, this is how many meetings are run.

d. This gives the teacher the opportunity to hear from all the students, instead of just those who can yell the loudest.

On the board, put a "normative system chart," similar to the one in Activity Two, for the norm observed immediately above. Leave the diagram on the board until the end of the day (until the end of the study unit, if possible).

LEARNING EPISODE FOUR

Skills and Learning Activities

Applying definitions to specific circumstances and situations. Creating classroom materials. Observing behavior. Following instructions; filling out worksheets. Making judgments about personal behavior. Choosing one from a group of items. Oral language for discussion. Conducting an experiment; observing and recording observations; using forms for recording; participating in group activity.

Activity One (Time: one 20-min. time segment, preferably right before lunch)

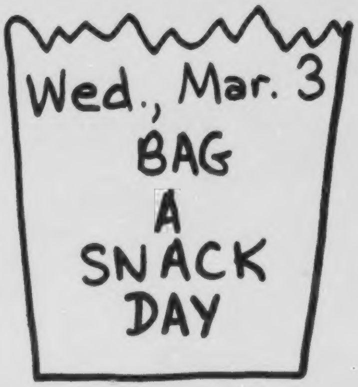
Preparation and materials: obtain pictures of various foods -- including soup, milk, a piece of cake, a meat dish, a vegetable, a glass of water, a potato, cookies, ice cream, salad and bread or rolls. These pictures should be placed on a display board (or the bulletin board) below a sign reading "There are norms for eating, too!"

Also, one snack bag for each student.

1. Ask the children if anyone can think of any norms or habits we have about food. (Use the pictures as prompting devices.) Some possible answers might include:

    Eat soup first.
    Eat dessert last.
    Cut meat with a knife.
    Eat slowly.
    Don't talk with mouth full.
    Keep elbows off table.
    Eat everything on plate before dessert.
    Keep napkin on lap.

2. Pass a lunch bag to each member of the class. Instruct them to place tomorrow's date near the top of the bag in crayon. In large letters underneath, have them print "Bag a Snack Day." For example:



3. Tell the class to take the bag home as a reminder to bring a special snack in the next day.

Activity Two (Time: one 20-min. time segment)

1. All members of the class, including the teacher, have a Snack Bag with a snack. Weather permitting, the class can go outside for the snack. If the weather or season is inappropriate, the snack session can take place on the floor in the classroom.

2. Tell the class that they have been studying habits and norms. During this snack session, each child will be asked to watch for good and bad habits. During the session, children can form small conversation circles or snack while listening to various "shows and tells."

3. Before cleaning up from snack, discuss some of the good and bad habits seen without mentioning any names.

4. Before leaving the snack session, mention that you often see one especially bad habit that often occurs when people aren't thinking - littering! Tell the class that starting tomorrow (or even that afternoon) everyone will be learning more about that very bad habit.

Activity Three (Time: one 15-min. time segment)

Preparation: Photocopy sufficient quantity of the worksheet (end of unit) to provide one for each student.

1. Hand out worksheet. Instruct class:

   "This is a different kind of a test. You will test yourself. Don't put your name on the paper. I want each of you to think about littering and answer these questions as honestly as you can. You will be the only one who knows how you answered. We will put all the papers in the waste basket just as soon as we finish talking about what those questions and your answers mean." (Allow two or three minutes for children to complete worksheet.)

2. Interpretation of the worksheet. Use material below to explain purpose of test and what it shows:

   "We've been studying about norms -- the habits people have. Scientists have found that there are three predominant norms about littering.

   "The first is that people tend to litter where litter already is. If you answered question #1 with 'on a pile of trash,' you follow that norm. On question #2, you follow the norm if you answered 'on top of the pile,' and on the last question, if you answered 'in the lot,' you follow the norm, too.

   "The other norms about littering are that people tend to litter where they think someone else will clean up after them. Where might some of these areas be?" (cafeteria, on the street, in the hallway, etc.) The third important norm is that people tend to litter on someone else's property, rather than their own."

   "But, remember, that first norm -- people tend to litter where litter already is -- is the most common norm about littering. Today, we're going to do an experiment, to see if the students here follow that norm. Before we go outside, you might want to look at the answers on your worksheet again: did you go along with the norm that said 'Most people litter where trash already is?'"

Experiment (Time: one time segment, approximately 30-min., near the end of the schoolday)

Preparation: Arrange with the principal to stagger the dismissal schedule the day this unit is to be taught, with a five-minute break after the first two or three classes have left, to enable your class to carry out an experiment. If necessary, secure permission to hand out cookies or candy to other classes. Obtain enough small cookies or candies, wrapped in paper, to provide one to each child in four or six classes as they leave the school building. Collect enough dry waste material -- paper, small packages, bottles, wrappers and cans -- to fill a medium-sized grocery carton, and obtain one large, clean and attractive litter basket.

Also, photocopy enough copies of the tally sheet (end of unit) for the class.

1. Divide the class into two groups. Provide each group with half the wrapped cookies and copies of the tally sheet (end of unit) for recording observations.

2. Have each group choose one child to be the "cookie dispenser," and one child to serve as monitor. It is the monitor's job to alert an observer, by name, softly, to start watching a subject student as soon as he or she receives a cookie and starts to move away from the "cookie dispensing station."

3. Have the children who will act as observers put their names and the number of their group at the top of the tally sheet. Go over the recording instructions with them until satisfied that they know what to do. Emphasize the importance of staying right beside the "cookie dispensing station," and of not letting a subject student realize that he or she is being watched. Remind them, too, to let the monitor know, quietly, when they have finished observing one subject and are ready to watch another.

4. About 10 minutes before school is to be dismissed, station Group I about 20 feet from the exit the departing students will use. Have one or two members of Group I take the box of previously collected trash to a point about 10 yards from the "cookie dispensing station" and empty it in a pile at the right hand side of the sidewalk.

5. Remind the observers of their instructions.

6. With the help of another teacher, if necessary, steer the departing students into an orderly line, to collect their cookies one at a time.

7. At the break in the dismissal procedure, have the students in Group I quickly clean up the pile of litter -- and any stray trash in the area -- and take it to the proper disposal point. Collect the tally sheets and dismiss Group I.

8. Have Group II set up its "cookie dispensing station" at the same place as Group I. Have one or two students place the attractive litter receptacle where the loose refuse was piled by Group I, about 10 yards from the cookie dispensing station, on the right side of the sidewalk.

9. Have Group II follow the same procedure as Group I.

10. When all the cookies have been distributed, collect the tally sheets. Have the children pick up any wrappers that were littered, put them in the litter receptacle, take the receptacle to the proper disposal point. Dismiss Group II.

LEARNING EPISODE FIVE

Skills and Learning Activities

Reading forms, interpreting raw data, testing hypotheses. Counting, adding, subtracting, multiplying, recognizing simple fractions. Drawing conclusions from numerical data.

Activity (Time: one time segment, approximately 20-30 min.)

1. Put the tally sheet on the board. Give Group I observers the tally sheets they filled out the day before. Remind children that Group I was trying to find out if most students in this school follow the norm that it's o.k. to litter where trash has already collected.

2. Have each Group I observer, in turn, read aloud the notations on his tally sheet -- pile, couldn't tell, pile, took with, etc. As they read, put their notations on the tally sheet on the board.

3. When all the Group I observers have read their notations, have the children count up the X's in each column.

4. Ask, can we use that number to tell us if most students in this school litter where litter already is? We couldn't tell what (give number in that column) did with their wrappers. Should we count them in figuring out what "most" students in this school do? Should we subtract them from the total number of students and just use the ones we saw do something with their wrappers?

   (If more than half were "couldn't tell," explain why this makes the experiment invalid and consider repeating it at a later date.)

5. Let's take away the students we couldn't tell about. How many subject students do we have left? (Make a circle on the board and write that number on top)

6. What would half that total be? (Cut the circle in half and put the appropriate number in each half.)

7. Is that "most students" of the ones we could observe? How many students in our experiment would have to act a certain way for us to be able to say that "most of the students we observed" act that way? Three quarters? How many would that be? If we take half of one half (divide the circle again, write the appropriate number in each quarter of the circle), that tells us how many in one quarter. So three quarters would be three times that number. Does anyone have the answer? (Write the answer on the board.)

Discussion

Interpreting the data will, of course, depend on how many student subjects threw their wrappers on the pile, how many on the ground and how many took them with them. If more than half took the wrappers with them, this might indicate that the students in your school have particularly positive norms about handling trash. In cities certified in KAB's CLEAN COMMUNITY SYSTEM (the behavioral approach to waste handling), this might indicate that the program there is, indeed, changing norms. If more than half or three quarters of the student subjects threw their wrappers on the pile or on the ground, ask the class what the environment of their school would be like if that many children changed their habits and always disposed of trash properly. Remind the class that the purpose of Group II's experiment was to see if an attractive litter receptacle would encourage children to use it.

Activity

Repeat steps 1 through 7, using the Group II tally sheets.

8. Review the other norms -- people tend to litter where they think someone will clean up after them, where they feel the property belongs to someone else.

9. Ask the children to suggest things they could do, as a class, to help change the normative system which encourages littering.

10. Carry out one or more of these suggested activities during the remainder of the term.

EVALUATION INSTRUMENT

The following three pages contain the evaluation instrument for the Third Grade unit. It should be administered during the first time segment for the unit, and re-administered after completing Learning Episode Five. A Teacher's Guide for scoring is included on the page following the evaluation instrument. Score each student's responses separately, and after each test. (Staple the pages of the evaluation instrument together.)

Stress to the students to choose the response indicating the most important reason.

Name____ Class___________________

All of the reasons for doing the things suggested below are true. Some are more important than others. Please underline the reason you think is most important.

Example

I should do my homework tonight because:

a. my teacher yells at me if I do not do my homework

b. I will be asked questions tomorrow

c. my Mom wants me to do it

d. when I grow up, I will need to know all the things I am learning now

1. It is not good to pull leaves and branches off trees in the park because:

a. it might kill the trees

b. it makes a mess

c. we need trees in our world

d. you will get in trouble if you are caught

2. My parents should never drive over the speed limit on the highway because:

a. it is dangerous

b. it costs more to drive fast

c. they will get a ticket

d. speeding wastes energy

3. Collecting things for recycling is a good idea because:

a. my teacher says so

b. it saves energy and other things we need to make new things

c. it is an easy way to make money

d. it helps clean things up

4. I should not push trash down storm sewers because:
    - a. they might overflow next time it rains
    - b. it will spoil the water
    - c. I might get caught and punished
    - d. only babies do dumb things like that

5. When I take the garbage cans out to be picked up by the garbage truck, I should make sure that the lids are on tight because:
    - a. the man on the truck might get mad if I don't
    - b. the trash could get loose and blow away
    - c. my dad told me to put the lids on tight
    - d. dogs could get into the cans, eat the garbage and get sick

6. When the house is cold, I should put on a sweater instead of turning up the heat because:
    - a. saving energy is important
    - b. heat costs a lot of money
    - c. hot dry air is bad for plants and animals
    - d. my mother told me not to turn up the heat

7. We should have a litterbag in our car because:
    - a. it saves money for the highway department when you don't throw things out of the car
    - b. it helps keep the car clean
    - c. litter pollutes the environment
    - d. the police might give you a ticket for throwing stuff out the window

8. It is wrong to throw trash and junk in vacant lots because:

   a. it makes a mess

   b. it spoils the neighborhood

   c. it brings rats and bugs

   d. it makes people angry

9. My parents should keep our car tuned because:

   a. it runs better

   b. it makes less noise

   c. it keeps the air cleaner

   d. it is safer

10. We should keep our school clean because:

    a. the trash might blow into someone's yard

    b. the principal likes things clean and neat

    c. we are good school citizens

    d. it is a good habit

11. Turn the water off while you are brushing your teeth because:

    a. you do not want to get splashed

    b. it saves water

    c. it saves energy

    d. it is quieter

12. In cities and towns, dogs should not run loose because:

    a. they could make messes where children play

    b. they could get hit by cars

    c. they could knock over garbage cans and spread the stuff around

    d. they could bite somebody

Third Grade Evaluation Instrument - Teacher's Guide

Values have been assigned in an ascending scale, with the largest number of points assigned to those responses which indicate greater awareness of the impact a particular action has on the total physical environment.

Question 1:

a. 2 b. 2 c. 3 d. 0

Question 2:

a. 1 b. 0 c. 0 d. 3

Question 3:

a. 0 b. 3 c. 0 d. 2

Question 4:

a. 1 b. 3 c. 0 d. 0

Question 5:

a. 0 b. 3 c. 0 d. 2

Question 6:

a. 3 b. 1 c. 2 d. 0

Question 7:

a. 1 b. 1 c. 3 d. 0

Question 8:

a. 2 b. 3 c. 2 d. 0

Question 9:

a. 0 b. 3 c. 3 d. 1

Question 10:

a. 3 b. 0 c. 1 d. 1

Question 11:

a. 0 b. 3 c. 3 d. 3

Question 12:

a. 3 b. 1 c. 3 d. 2

STUDENT WORKSHEET

1. You are walking along the street, eating a candy bar and want to get rid of the wrapper. There is no receptacle around. Where would you put the wrapper?

    a. on the sidewalk

    b. in the gutter

    c. on a pile of trash in a vacant lot

2. You are eating lunch in the schoolyard. When you are finished, you take your napkin and sandwich bag to the receptacle, but it's full and overflowing. What would you do with your trash?

    a. throw it in the bushes

    b. put it on top of the pile by the receptacle

3. On your way home from school, you buy a soda and drink it as you walk. Just as you finish it, you are passing a fence that divides a trash-covered lot from someone's front lawn. On which side of the fence would you be more likely to throw the can?

    a. lot

    b. lawn

Littering Experiment
Tally Sheet

Instructions:

When the monitor says your name, watch what the subject student does with the wrapper and put an X in the column that best describes what the student did, as in samples printed at top of sheet.

Do not move from where you have been stationed.

When you finish watching one student, tell the monitor, quietly, that you are ready to watch another.

Name

Group #

	threw wrapper on trash pile/ in receptacle	threw wrapper on ground	took wrapper with him/her	could not see what he/she did
			X	
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				

RESOURCE MATERIALS

THIRD GRADE

A. Audio-Visual Aids

Filmloop:

1. "The Trash Problem," Contact: Ealing Film-Loops, Cambridge, Mass.

Films:

1. "Meecology" (26 min.) - Portrays children from varied surroundings (rural, urban, suburban and inner city), showing how each child relates to his environment in an ecologically productive way. (Complemented by a school teaching aid called the "McDonald's Ecology Action Pack.") Contact: Modern Talking Picture Service, New York (loan); Peshak Films, Lake Forest, Ill. (purchase).
2. "The Litter Monster" (15 min.) - Encourages young people to look around themselves and see what they can do about the litter spoiling our environment. Contact: Association Instructional Materials, New York (rental); Alfred Higgins Productions, Inc., Los Angeles (purchase).

B. Bibliography

Teacher:

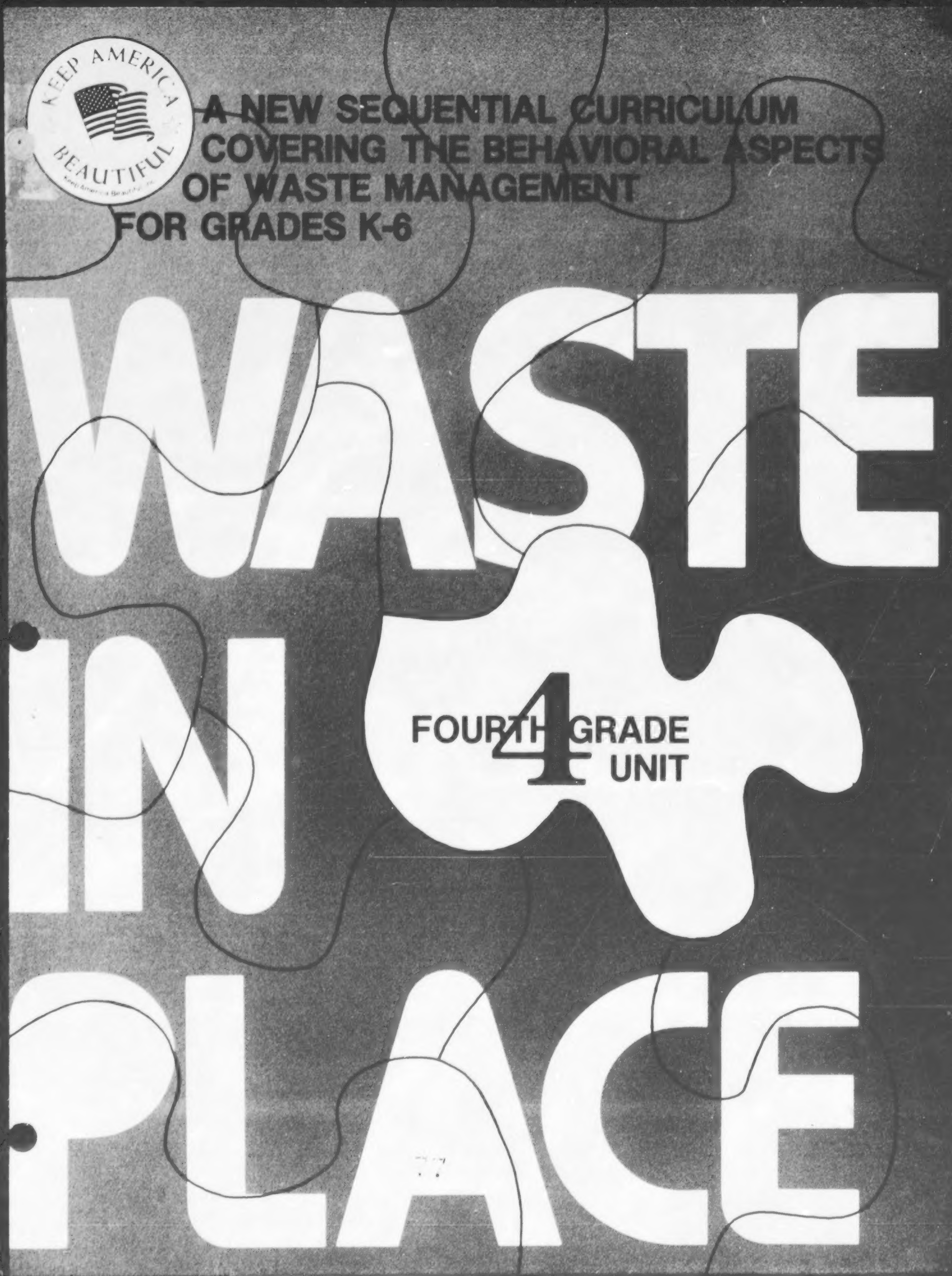
1. de Leeuw, Adele and Cateau. *Make Your Habits Work for You*, Pellegrini and Cudahy: New York (1952).
2. Environmental Action Coalition. *It's Your Environment: Things to Think About - Things to Do*, Charles Scribner's Sons: New York (1976).
3. Hilton, Suzanne. *How Do They Get Rid of It?*, The Westminster Press: Philadelphia (1970).
4. Marshall, James. *Going to Waste*, Coward, McCann and Geoghegan, Inc.: New York (1972).

Student:

1. Gutnik, Martin J. *Ecology and Pollution/Land*, Children's Press: Chicago (1973).
2. Leaf, Munro. *Who Cares? I Do.*, J. B. Lippincott Company: Philadelphia (1971).
3. Shuttlesworth, Dorothy E. *Litter - The Ugly Enemy*, Doubleday and Company: New York (1973).
4. Simon, Seymour. *Science Projects in Pollution*, Holiday House: New York (1972).

KEEP AMERICA BEAUTIFUL

A NEW SEQUENTIAL CURRICULUM
COVERING THE BEHAVIORAL ASPECTS
OF WASTE MANAGEMENT
FOR GRADES K-6



WASTE IN PLACE

4
FOURTH GRADE UNIT

FOURTH GRADE

4 FOURTH GRADE UNIT

PURPOSE

The cumulative series of seven study units constituting the "Waste In Place" curriculum is designed to help elementary school children understand how their own habits affect the environment of their homes, schools and communities and to make them aware of the relationship between their own behavior -- and that of those around them -- and the total physical quality of life.

Solid waste is a major environmental problem in most areas of the country. Loose refuse degrades the aesthetic environment, contributes to water pollution, and is often a health hazard. Disposing of solid waste in an environmentally sound manner is becoming increasingly difficult as space for sanitary landfills runs out and pollution-free incineration becomes more costly. Resource recovery offers an excellent solution in areas where sufficient solid waste is generated to make this economically practical, but such a solution makes it even more important to insure that all waste is containerized and kept in the reclamation system.

There may be little the elementary school child can do to solve air and water pollution problems, but even a five-year-old can learn to handle refuse properly and to understand the relationship between his or her action and the quality of the environment in which he or she lives.

Through direct examination of the effect of changes in waste management practices in the home, the older child begins to identify poor waste management practices in his or her neighborhood and to appreciate their impact on the physical environment.

CONCEPT

Environmentally sound waste management begins with the individual, in the home.

OBJECTIVES

To enable each student to:

1. identify vocabulary words associated with solid waste and its management
2. demonstrate an awareness of how much solid waste is produced by individuals and households, and identify relationships between individual habits and good (or poor) waste management

3. identify sources of loose refuse (litter) in his or her neighborhood, and steps which might be taken to reduce the generation of loose trash from these sources
4. from among several possibilities, identify the factor which relates most directly to the proper handling of waste

EVALUATION

Test the students' knowledge of some of the factors which relate to proper handling of waste before initiating Learning Episode I. (The test instrument is included below, pg. 4-10.) Administer the same test about one week after completing all the Learning Episodes. Score and record individual scores at the completion of each test.

TIME

Depending on the classroom structure, the teacher and the speed with which students learn the various concepts, this unit should take about 10 time segments, each between 30 and 45 minutes. The evaluation unit should be administered during the first time segment, followed, on consecutive days, by the four Learning Episodes (each taking two time segments). About a week after completing the final Learning Episode, the Evaluation Instrument should be re-administered.

VOCABULARY

CONTAINER	- something that holds something else. CONTAINERIZE: put or keep something in the proper container.
DISPOSE	- get rid of an unwanted item.
DUMPSTER	- large refuse container, usually used by stores, restaurants, etc. to keep waste until it is collected by a sanitation department or other refuse hauling service.
ENVIRONMENT	- your surroundings, inside or out of doors.
GARBAGE	- another word for solid waste, especially for household waste.
HABIT	- an action a person does over and over again without thinking about it.
INCINERATOR	- a plant designed to reduce waste volume by burning, turning the waste into gases.
LANDFILL	- a large, outdoor area for waste disposal. Landfills where waste is improperly managed (i.e., can pollute the air or water or can become litter) are often called open dumps. Those where waste is properly managed are called sanitary landfills.

LEACHATE	- a liquid containing decomposed waste, bacteria and other noxious and potentially harmful materials which drains from landfills and must be collected and treated so as not to contaminate water supplies.
LITTER	- man-made (or man-used) solid waste that is disposed of in the wrong place or allowed to escape from a container.
NORM	- a habit shared by most people that makes them act a certain way in certain places or at certain times.
ORGANIC WASTE	- things that were once alive but are now no longer useful -- eggshells, coffee grounds, leaves, grass cuttings, food scraps.
POLLUTE	- to contaminate; to dirty. (Also POLLUTION - those things which contaminate.)
RECEPTACLE	- a container that is made to have things put into it. As used in this unit, primarily a container for small waste items, a litter basket, a waste basket.
RECYCLING	- collecting and treating solid waste for use as raw material in the manufacture of the same or a similar product, usually through low-technology processes.
REFUSE	- another word for solid waste.
RESOURCE	- something that can be used to make something else.
RESOURCE RECOVERY	- taking usable materials or energy out of solid waste, usually through high-technology processes.
SANITARY LANDFILL	- a large, outdoor area for waste disposal where discarded materials are usually compacted before being covered with a layer of earth. (If the earth cover is not thickly and carefully applied, a sanitary landfill can become an open dump.)
SCRAP	- another word for solid waste, especially materials left over from construction or manufacturing suitable for reprocessing.
SOLID WASTE	- all useless, unwanted or discarded materials.
TRASH	- another word for solid waste.

LEARNING EPISODE ONE

Skills and Learning Activities

Good listening skills; oral language use; vocabulary development; word recognition. Following oral and written instructions; relaying instructions to others. Measurement techniques; observation and reporting; completing written forms.

Preparation: Before initiating this episode, reproduce permission slips (Appendix A) and have children take them home for parental approval of the experiment. Also, obtain (or reproduce) sufficient copies of Appendices B and C to provide one copy for each student.

Activity (Time: two 30-min. time segments)

1. Introduce topic of solid waste management by asking:
   a. Can anyone think of something in our everyday lives that can pollute our environment, that can cause three kinds of pollution -- air pollution, water pollution and land pollution? Continue discussion until reference is made to garbage or trash (or introduce concepts).
   b. How does garbage or trash pollute the air? (Burning in open dumps.)
   c. How does it pollute the water? (Leachate -- run off -- from open dumps, some sanitary landfills, accumulated loose refuse in empty lots, gutters, etc.)
   d. How does it pollute the land? (Open dumps, litter.)
   e. Garbage and trash are also called "solid waste." Solid waste that is put or kept where it belongs usually does not cause pollution. Today we are going to learn some words that have to do with keeping garbage and trash -- solid waste -- where they belong.
   f. Introduce vocabulary by putting each word on board, discussing definition.
2. Hand out student vocabulary worksheets (Appendix B).
3. We are going to study this puzzle and see how many words we can find that have something to do with solid waste. These are the names of things we throw away after we have finished with them, or words that tell how we can get rid of waste, or what happens when we do not dispose of waste properly.

   This is a game, not a test. Just see how many words you can find. I will give you a clue. There are 29 words or phrases in this puzzle. Some of them are on the board, but some of them have not been mentioned in class. You may recognize them from last year or from your reading, or from TV. (Allow 15 minutes for completion of the puzzle.)

4. Review the words from the answer sheet (Appendix Bb). Reinforce the vocabulary concepts with discussion.

5. Misplaced solid waste is one kind of pollution all of us can help get rid of. But to do that, we need to understand how garbage and trash get loose in the first place. Tonight, I would like you to try an experiment at home that will help us to see how it happens.

6. Your parents have given permission for you to put all the waste baskets in your home in a closet, or the garage, or somewhere out of sight. For the experiment, take just one waste basket, or a box, or some other container and put it where everyone in your family can see it -- but not where a waste basket is usually kept. Don't put it in the bathroom, or the kitchen, but perhaps in the hall or on the stairs, or in the middle of the living room. Ask your family to use only this container for the next 24 hours. All the organic waste, of course, will be put where it usually goes, but you might remind your mother that all the non-organic waste from the kitchen should be put in the experimental waste basket.

7. Before you begin your experiment, please weigh the box or waste basket that you are going to use. Write down how much it weighs on this sheet. (Pass out Appendix C.) Tomorrow night, I would like you to fill in the rest of the form.

   (The following day, remind the students to complete the experiment.)

LEARNING EPISODE TWO

Skills and Learning Activities

Reading report forms; computing from original data; averaging; deductive reasoning. Composition based on observation; reading aloud.

Activity One (Time: one 30-min. time segment.)

1. (Teacher may wish to review the discussion in Learning Episode One.) Were you surprised at how much waste your family generates in 24 hours? If you divide the number of pounds you collected by the number of people in your family, you will see how much each individual generates in a day. When you have that number, raise your hand. We will make a chart to see just how much waste we are responsible for. Just think, if all that waste got loose, how much litter there would be.

   Put chart on board:

Child's Name	Total Trash Collected	No. of People In Family	Average lbs. Per Person Per Day	Average Per Person Per Week	Average Per Person Per Year

2. Now, let's go back and see how much waste that is a week. If we multiply each individual's average by 7... Can each of you tell me how much each person in your family would generate in a week? (List amount on chart.)

3. Now, if we multiply the weekly average by 52 that will give us the yearly average. Please work out the yearly average for individuals in your family and raise your hand when you have the answer. (List amount on chart.)

4. Now, if we add up all the numbers in the last column on the chart (do so) we can see how much solid waste just the members of our own families generate. Can you imagine what our neighborhoods would look like if all this waste got loose and piled up as litter? You can see why it is important to make sure that when waste is put out for the sanitation department to collect that it is carefully covered or tied -- properly containerized.

Activity Two (Time: one time segment, 30 to 45 min.)

1. Let's begin today by talking about our waste experiment. Was the experiment fun? Did everyone in your family enjoy it, or did someone not like it?

2. For the next 15 minutes, I would like you to write a story about what happened in your house last night when your family had to go to a special place to dispose of waste.

Discussion

1. Whose story tells about problems that happened when your family had to go to a special place to dispose of waste? (Have several students read their compositions aloud.)

2. What these stories show is that people, ourselves, our families, the people in the street, have habits about putting things that are to be disposed of in certain places -- in "expected" places. When people can't act the way they expect to act, the way they are in the habit of acting, they may get upset.

3. In our homes, we usually have lots of containers for waste. And most of us use them, almost all the time, because we want our homes clean, we want a clean environment. We are in the habit of using waste baskets. Our parents expect us to use the waste basket. It's a rule in most families. But what happens when we are forced to change our habit, to walk all the way downstairs or down the hall to use the waste basket?

4. Did anyone litter during the experiment? Did they leave things that should have been thrown away on the sink in the bathroom, or on the floor in front of the TV? Did your parents have to remind anyone to take things to the waste basket?

5. Did anyone make a waste container out of a box or a bag and put it where the waste baskets usually are in your house? We don't like to change our habits. We all prefer to do what we are used to doing.

6. If a person is willing to walk all the way downstairs or down the hall to dispose of waste properly at home, do you think that, outdoors, he or she would always carry a piece of trash to a litter basket? Why not? Why don't we care about the outdoors -- our playground, the neighborhood -- the way we do about our own homes?

7. What could we do to encourage people to have better trash handling habits outdoors?

LEARNING EPISODE THREE

Skills and Learning Activities

Map reading; observation and recording; interpreting data; deductive reasoning. Oral language use; reinforcing newly acquired concepts and facts pictorially. Good listening skills; following oral instructions.

Preparation: From the city zoning office, planning office, tax office, obtain a large, detailed map of the area served by the school. (If the area served by the school is very large, perhaps county-wide, use a map showing two square miles around the school.) Also secure a sufficient quantity of colored drawing pins (see Activities One and Two.)

Activity One (Time: one 45-min. time segment.)

1. Today we are going to take a look at the area around our school and see if we can see any loose refuse and, perhaps, figure out where it came from and how it escaped from the proper container. (Put map up in front of class.)

2. Before we go out, let's look at the map and decide if there are places in this area that are more likely to be littered than other places. We don't have a great deal of time, so we had better plan our survey.

3. Have the children suggest locations. (If necessary, suggest shopping centers, high density residential areas, parking lots, vacant lots, bus stops, highway entrances, etc.) Mark on map with drawing pins.

4. Researchers have found that loose refuse comes from many sources, but the most common ones are poorly containerized household waste -- that's why it is so important to be sure that when you take the trash out for your family, it is covered or tied so none of it can escape -- poorly containerized commercial waste, delivery areas that are not kept neat and clean, construction sites that are not kept neat and clean and uncovered trucks carrying things that could blow or fall off. While we are surveying the school neighborhood let's try to notice if we see any of these things -- or other places where refuse has escaped from a container and become litter, or even places where people just throw things on the ground.

5. Take the class on a tour of the mapped area, concentrating on those locations where loose refuse is most likely to be found.

Activity Two (Time: one 30-min. time segment.)

1. Give each student a colored drawing pin and ask him or her to mark a spot on the map where he or she observed loose refuse.
2. Have the students draw cartoons of the source of the litter they identified, i.e., overflowing litter basket, dumpster with trash around it, uncovered truck, motorist, etc.
3. You have drawn a picture of where the litter comes from. We know that people start the problem because they have bad habits about handling waste. Now draw a picture of the person whose bad habit let the waste escape from that source.
4. Let's look at some of the drawings and see if we can make suggestions of ways to get people to change their habits about waste handling at that place. (Empty receptacles more frequently; sweep up around dumpster; put out more litter baskets; write letters to contractors asking them to clean up construction sites, etc.)
5. When you go home tonight, I would like you to draw a map of the block you live on. Walk around your block and put a □ (square) on the map for every house, an X for every store or restaurant or other commercial establishment, and an O wherever you see a waste container -- a garbage can, dumpster, or litterbasket -- and a dot wherever you see loose refuse. (Draw a sample map with the legend on the board.)

LEARNING EPISODE FOUR

Skills and Learning Activities

Recording observations; using symbols; mapping. Analysis of symbolic data; oral language use; hypothesis formation. Organizing; planning; role playing.

Activity (Time: one 30-min. time segment for #1-2; one 40-min. time segment for #3-5.)

1. Have students transfer the data from their individual maps to the master map.
2. Initiate discussion by asking what kind of litter was most common.
   a. Is there any pattern to where litter was found? Is it more prevalent where waste containers are present or absent?

b. If litter was prevalent in areas where there were waste containers, continue discussion by asking the following:

   (1) Were the containers overflowing?
   (2) Did they have lids or covers?
   (3) Could animals have knocked them over, spreading the refuse around?
   (4) If the containers were in good condition and not overflowing, is it possible that some people didn't even try to get their waste in the containers, but just tossed it in that general direction? If it seems that people "just tossed," what might be the reason for such a poor habit?

c. If litter was more prevalent where there were no waste containers, can anyone suggest why people didn't carry their waste with them until they could dispose of it properly. What could be done to encourage better habits about handling waste?

3. Divide the class into three or four groups.

4. Have each group select one neighborhood from the map where litter was prevalent.

   a. Have each group pretend to be the members of the block association in that neighborhood and develop a plan to help to insure that all waste is properly containerized.

   b. Have the students within each group select roles as committee chairpersons assigned to carry out various aspects of their plan, act out what they would do before the rest of the class.

5. Have the class as a whole vote on what they consider the three or four better ideas from those presented by the role players. If practical, follow up on some of those ideas later in the term.

EVALUATION INSTRUMENT

The following pages contain the evaluation instrument for the Fourth Grade unit. It should be administered during the first time segment of the unit, and re-administered about a week after completing Learning Episode Four.

Photocopy the evaluation tool so there will be one for each student. Staple.

Instructions: circle the letter of the answer which best completes the sentence. (Work through example below.)

For example:

O. The proper place for waste out-of-doors is:

a. on the street
b. in a trash can
c. on the sidewalk
d. in the bushes

The answer, of course, is "b" -- so "b" is circled.

ANSWERS:

1. d
2. b
3. a
4. b
5. d
6. b
7. c
8. d
9. c
10. d

Name: ______________________________ Class: ________

Directions: Circle the letter of the answer which best completes the following sentences.

O. The proper place for waste out-of-doors is:

a. on the street
b. in a trash can
c. on the sidewalk
d. in the bushes

1. Poorly handled trash and garbage contribute to:

a. air pollution
b. water pollution
c. land pollution
d. all of the above

2. The loose trash and garbage in our community comes from:

a. school children
b. many sources
c. overflowing litter baskets
d. people in cars

3. Litter is:

a. misplaced man-made solid waste
b. what people throw on the ground
c. garbage in cans

4. What people do with their trash and garbage is largely a matter of:

a. the law
b. habit
c. chance
d. the weather

5. The main reason we have waste baskets and garbage cans in our homes is to:

a. prevent littering
b. keep our homes neat and clean
c. prepare waste for later removal
d. all of the above

6. Dumpsters are used by the sanitation department to:

a. incinerate garbage
b. keep waste until it can be collected
c. crush and compact trash
d. bury garbage

7. Waste materials can be reused by:

    a. incinerating
    b. collecting and storing
    c. recycling
    d. disposal

8. Our city can be kept clean by:

    a. the sanitation department
    b. school children
    c. adults
    d. everyone

9. Resource recovery means taking usable materials or energy out of:

    a. minerals
    b. metals
    c. solid waste
    d. the air

10. Litter is:

    a. ugly
    b. unnecessary
    c. costly
    d. all of the above

Appendix A

Fourth Grade

Permission Slip

Dear parent:

To help our students understand the problems poorly handled refuse and trash can cause in our environment, we would like your help in conducting an experiment on the attitudes and habits most people have about disposing of waste items.

For 24 hours, starting ______________________________, we would like your
(time, day and date)
family to use only one waste basket. (Food scraps, coffee grounds, and other organic wastes will not be included in the experiment. They should be put where they are usually disposed of. Other kitchen waste, however, should be placed in the experimental container.) All other waste receptacles should be put away for 24 hours.

To carry out the experiment, it will be necessary for your child to weigh the container at the beginning and the end of the 24 hour test period. Do you have a scale in your home that can be used for this purpose? Yes ______ No _____

If you are willing to cooperate with this experiment, please sign below.

________________________________ has my permission to participate in the solid
(name of student)
waste experiment. The family will cooperate.

____
(parent signature)

Appendix B

Fourth Grade

Student Worksheet

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
1.	D	I	S	P	O	S	E	I	E	A
2.	L	F	O	O	D	T	I	N	N	R
3.	A	Z	L	M	T	H	X	C	V	E
4.	N	C	I	A	R	A	O	I	I	S
5.	D	O	D	N	A	B	R	N	R	O
6.	F	N	W	O	S	I	G	E	O	U
7.	I	T	A	M	H	T	A	R	N	R
8.	L	A	S	E	C	A	N	A	M	C
9.	L	I	T	T	E	R	I	T	E	E
10.	X	N	E	A	N	E	C	O	N	Q
11.	R	E	Q	L	O	C	W	R	T	G
12.	E	R	T	I	R	E	A	C	T	A
13.	C	W	D	U	M	P	S	T	E	R
14.	O	S	V	B	O	T	T	L	E	B
15.	V	C	A	R	S	A	E	X	W	A
16.	E	R	E	C	Y	C	L	E	Z	G
17.	R	A	P	O	L	L	U	T	E	E
18.	Y	P	P	A	P	E	R	G	U	M

Appendix Bb

Answers - Student Worksheet

1. DISPOSE
2. FOOD, TIN
3. -
4. -
5. -
6. -
7. -
8. CAN
9. LITTER
10. -
11. -
12. TIRE
13. DUMPSTER
14. BOTTLE
15. CARS
16. RECYCLE
17. POLLUTE
18. PAPER, GUM

a. LANDFILL, RECOVERY

b. CONTAINER, SCRAP

c. SOLID WASTE

d. METAL

e. TRASH, NORM

f. HABIT, RECEPTACLE, TAR

g. ORGANIC WASTE

h. INCINERATOR

i. ENVIRONMENT

j. RESOURCE, GARBAGE

Appendix C

Solid waste experiment observation form

______________________________________ ____________________
student name date

1. What time of the day did you put all the other waste baskets away and put your experimental container where everyone could use it? __________________
2. What kind of container are you using in the solid waste experiment?

   ____
3. How high is it? ____________ How long is it on the long side? ________

   How long is it on the short side? _______________
4. How much does it weigh when it is empty? ___________________
5. What time of day did you put all the other waste baskets back where they belong and weigh your experimental container? _____________________________
6. How much did it weigh with all the solid waste in it at the end of 24 hours?

   ____
7. How many people in your family took part in the experiment? _____________
8. Ask your mother or father to write below if they think that having only one waste basket made it harder or easier for the members of the family to dispose of waste properly.

   ____

   ____

   ____

   ____

RESOURCE MATERIALS

FOURTH GRADE

A. Audio-Visual Aids

Films:

1. "A Community Park" (8 min.) - A garbage-strewn lot becomes an adventure playground through people working together. Contact: Youth Film Distribution Center, New York.

2. "A Place to Begin" (13½ min.) - The citizens of Macon, Ga., speak about how the CLEAN COMMUNITY SYSTEM (Keep America Beautiful, Inc.'s behavioral approach to changing attitudes about the handling of waste) worked in their city. Contact: Keep America Beautiful, Inc., New York.

3. "Help Yourself" (29 min.) - How behavior is influenced by the physical and social aspects of the environment. Contact: Circulation Department, Indiana University Audio-Visual Center, Bloomington, Ind.

4. "Money to Burn" (20 min.) - Depicts waste and the unsightliness of litter. Contact: Travel and Information Division, Texas Highway Department Film Library, Austin.

5. "The Trouble With Trash" (28 min.) - Refuse problems and solutions are shown and discussed. Contact: Modern Talking Picture Service, New York.

6. "Wealth Out of Waste" (20 min.) - Explains secondary recovery techniques presently in use or experimentally in operation throughout the United States. Contact: Bureau of Mines, U.S. Department of the Interior, Washington, D.C.

B. Bibliography

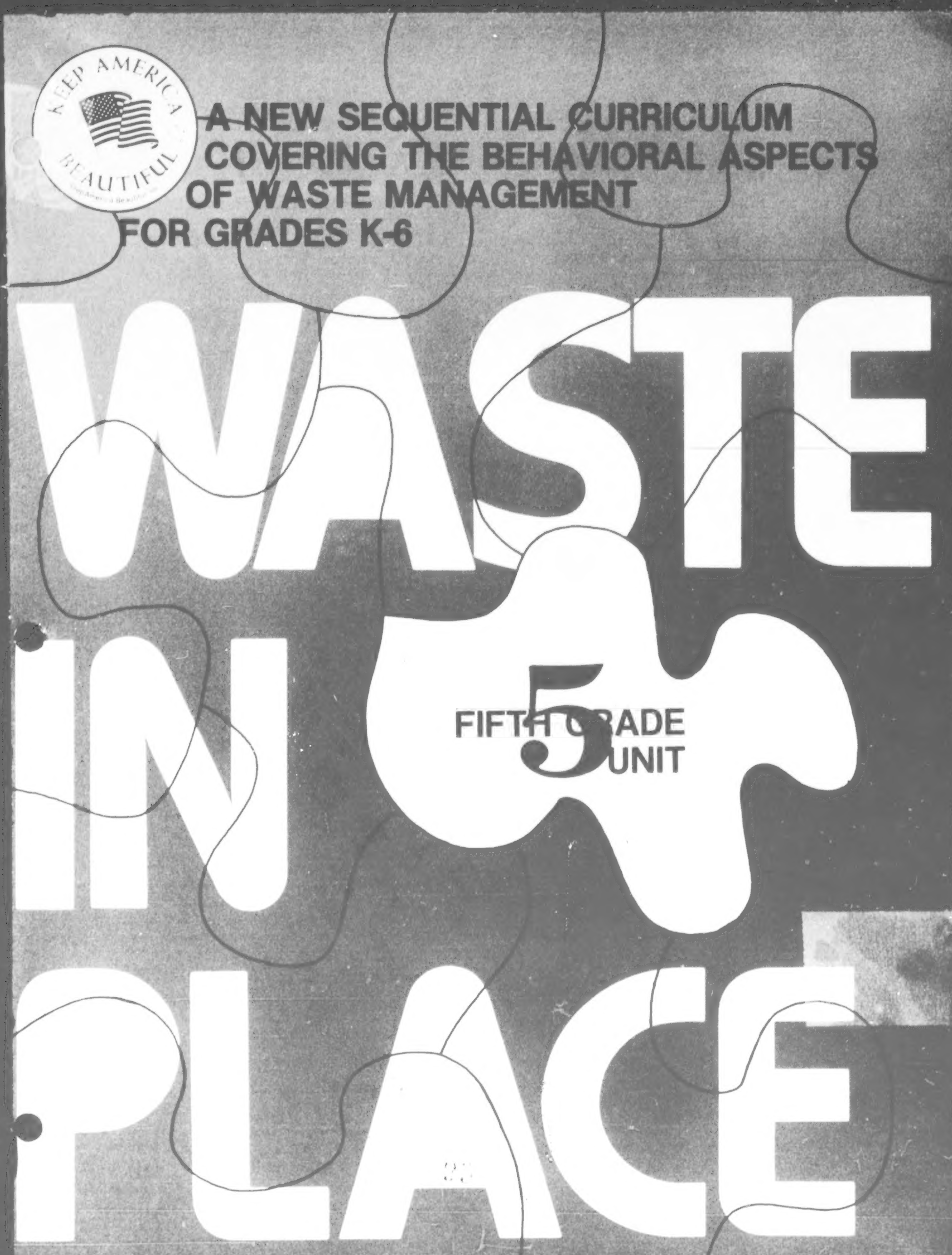
Teacher/Student:

1. Asimov, Isaac. ABC's of Ecology, Walker & Co.: New York (1972).

2. Binzen, Bill. The Walk, Coward, McCann & Goeghegan, Inc.: New York (1972).

3. Miles, Betty. Save the Earth, Alfred Knopf: New York (1974).

4. Shuttlesworth, Dorothy E. Litter - the Ugly Enemy, Doubleday and Co.: New York (1973).



KEEP AMERICA BEAUTIFUL

A NEW SEQUENTIAL CURRICULUM
COVERING THE BEHAVIORAL ASPECTS
OF WASTE MANAGEMENT
FOR GRADES K-6

WASTE IN PLACE

5

FIFTH GRADE UNIT

FIFTH GRADE

5

FIFTH GRADE UNIT

PURPOSE

The cumulative series of seven study units constituting the "Waste In Place" curriculum are designed to help elementary children understand how their own habits effect the environment of their homes, schools and communities and to make them aware of the relationship between their own behavior -- and that of those around them -- and the general physical quality of life.

Solid waste is a major environmental problem in most areas of the country. Loose refuse degrades the aesthetic environment, contributes to water pollution and is often a health hazard. Disposing of solid waste in an environmentally sound manner is becoming increasingly difficult as space for sanitary landfills runs out and pollution-free incineration becomes more costly. Resource recovery units offer an excellent solution in areas where sufficient solid waste is generated to make recycling economically practical, but such a solution makes it even more important to insure that all waste is containerized and kept in the reclamation system.

There is little the elementary child can do to solve air and water pollution problems, but even a five-year-old can learn to handle refuse properly and to understand the relationship between his or her action and the quality of the environment in which he or she lives.

Older students can begin to appreciate the complexities of solid waste management and to perceive that individual and community-wide attitudes and habits often must be changed if the waste management system is to be improved.

CONCEPT

Managing solid waste so that it does not harm the environment is a complex task.

OBJECTIVES

To enable each student to:

1. Identify three different methods of processing solid waste.
2. Associate each method with one of its advantages and one of its disadvantages.

EVALUATION

Test students' knowledge of waste management concepts and practices before initiating Learning Episode One. (The test instrument is included below, pg. 5-16.) Administer the same test a week after Learning Episode Five has been completed. Score and record each student's results individually each time the test is administered.

TIME

Depending on the classroom structure, the teacher, and the speed with which students learn the various concepts, this unit should take between 16 and 17 time segments, each lasting between 20 and 60 min. One lesson (Learning Episode Two) is preceded by a field trip to a sanitary landfill in the community), another (Learning Episode Three, Activity Two) includes a library visit. Teachers should adapt the unit to meet the needs of their particular class. The first day's time segment will be devoted to administering the evaluation instrument. The evaluation instrument should be re-administered during the final time segment for this unit, about one week after completing Learning Episode Five.

VOCABULARY

BIODEGRADABLE	- material which decomposes naturally.
DECOMPOSE	- to break down to basic elements; to rot.
DISPOSE	- get rid of an unwanted item, or items.
ENERGY RECOVERY	- incinerating waste in such a way that the heat from the burning process can be used to make steam for heating, cooling and/or to make electricity.
INCINERATE	- reduce the amount of waste to be disposed of by burning it.
LEACHATE	- water which has drained through something (usually, solid waste), dissolved some of the material and become polluted as a result.
ORGANIC WASTE	- once living material that is now useless -- eggshells, coffee grounds, leaves, grass clippings, food scraps.
RECYCLING	- using materials recovered from solid waste to make new things.
RESIDUE	- what is left after waste has been incinerated, or after all the recoverable resources have been recovered.

RESOURCE	- something that can be used to make something else -- wood into paper, iron ore into steel, bauxite into aluminum, sand into glass; old cans into new cans, old bottles into new ones, old newspapers into cardboard.
RESOURCE RECOVERY	- taking usable materials (resources) out of solid waste, usually through high-technology processes. (What is not usable still has to be disposed of.)
SANITARY LANDFILL	- a large, outdoor area for waste disposal where discarded materials are usually compacted before being covered with a layer of earth (if the earth cover is not thickly and carefully applied, a sanitary landfill can become an open dump); a place to bury solid waste.
SOLID WASTE	- all useless, unwanted or discarded materials -- refuse, trash, garbage, debris.
SOLID WASTE MANAGEMENT	- everything that has to be done to get rid of all the waste that is produced in the community. This includes collecting it, transporting it and, finally, processing it in one way or another.
WASTE PROCESSING	- doing something to discarded materials so they can be handled more easily (incineration) or so resources can be recovered from them (recycling).

LEARNING EPISODE ONE

Skills and Learning Activities:

Good listening skills; reading aloud; oral language use; vocabulary development; visual word recognition; use of synonyms. Following oral instructions, concept recognition, cooperative problem solving, deductive reasoning, grouping concepts for reinforcement.

Preparation: Obtain (or reproduce) sufficient copies of Appendices A and Aa to supply one to each student and sufficient copies of Appendices B and Bb to provide each child with one B slip and 6 Bb slips. Cut the B and Bb sheets into slips along the dotted lines. Put the B slips in one box and the Bb slips in another.

Discussion (Time: one or two time segments totaling approximately 45-60 min.)

1. Initiate subject.

Today, we are going to start to study what some people call "the third pollution." We all know what air pollution is and what water pollution is. Does anyone have any idea what the "third pollution" could be?

2. If no one does, introduce the concept by writing on the board:

   THIRD POLLUTION garbage trash refuse SOLID WASTE

3. Waste itself does not pollute. When we dispose of it -- get rid of it -- properly, it does not hurt the environment. If you have a sandwich wrapper you want to get rid of and throw it on the ground, you are littering. You are polluting the land. But if you throw that warpper in a trash can, you are not littering; you are not polluting. If solid waste is disposed of properly, it does not hurt the environment. In fact, there are some ways of getting rid of solid waste that help the environment. We will talk about those ways later on.

   But first, we have to learn some new words -- technical words -- that will help us understand how solid waste can become "the third pollution" through improper waste management and what can be done to keep solid waste from hurting the environment.

4. Put the vocabulary words and the definitions on the board (or distribute copies of the list).

5. Ask a student to read the first word and the definition. Discuss the word and its meaning until satisfied that the class understands it. Follow the same procedure with each word in the vocabulary.

6. Those are words that are used a great deal by the sanitation department, by the people who are responsible for collecting, transporting and disposing of -- or processing -- solid waste in our community. We are going to meet some of the people who manage solid waste in our community in the next few weeks so we will want to be sure that we know those words and can use them when we talk to the sanitation workers, the landfill operator and other people who will be talking to us about waste management.

Activity One (Time: one time segment, approximately 30-min.)

1. Pass out puzzle (Appendix A).

   Let's take 10 minutes to test ourselves on the words we've learned about the "third pollution" -- solid waste. See how many of the vocabulary words you can find in this puzzle. There are other words that have something to do with waste management in the puzzle, too. See if you know those words from last year, or from your reading or from TV. I will give you a clue. There are 55 answers in the puzzle -- some are single words, some are two-word phrases.

2. How many did you find? Very good. Now, here is the answer sheet. See if you can find the ones you missed. (Pass out Appendix Aa.)

3. Teacher may wish to review words which were commonly missed before students worked with answer sheets.

Optional Activity

Have the students make sentences, using the words in the puzzle (from Activity One).

Ex. Food, such as eggs and sugar, is biodegradable.
Rain helps cardboard to decompose by giving mold a chance to grow on it.
Water oozes through garbage and forms leachate.
They doze a deep earth cover over the solid waste at a sanitary landfill.

Activity Two (Time: one 25-min. time segment.)

1. Let's play another game to see if we really understand the vocabulary of the "third pollution." This game is like trading cards, or baseball cards. You will be trading the cards in these boxes to get sets.

   All the big slips in this box have the name and the definition of one method of waste processing. They either say "Incineration," or "Sanitary Landfill" or "Resource Recovery." I would like each of you to take one slip from this box.

   In this second box are smaller slips with other words we have talked about, words that go with one or more methods of waste processing. Please take six of the smaller slips out of this box.

   Then I would like you to form groups of five. Trade your smaller slips within your group until you have a set of six words which apply to the waste processing method named on your big slip. I will give you a clue that will help. "Dispose" is a word that applies to all three methods of waste processing. There are other words on the smaller slips that apply to all three processes, too. You have 10 minutes for trading your slips with the members of your group.

2. Do any of you not have a set? Do you have smaller slips with words which do not apply to the waste processing method on your big slip? Please come to the front of the room and trade with each other until you have a complete set. (Allow five minutes for the completion of the trading operation.)

3. Have each student read the name of the waste processing method on his big slip and the words on the set of smaller slips he or she has acquired through trading. If any have acquired slips with words which don't apply to his or her waste processing method, correct the error and discuss until satisfied that he or she understands the mistake.

Set for SANITARY LANDFILL	Set for INCINERATE	Set for RESOURCE RECOVERY
Solid Waste	Solid Waste	Solid Waste
Dispose	Dispose	Dispose
Resource	Waste Processing	Waste Processing
Decompose	Resource	Resource
Biodegradable	Residue	Residue
Leachate	Energy Recovery	Recycling

Activity Three (Time: one time segment, approximately 15-25 min.)

1. Reproduce sufficient copies of Appendices C and D to supply one to each student.
2. Briefly review the vocabulary words introduced through the previous activities.
3. Distribute crossword puzzles.
4. Let's take some time to review the words related to solid waste management. See how many parts of the crossword puzzle you can complete by using the clues.
5. If necessary explain the procedure followed in solving a crossword puzzle. The vocabulary words may be placed on the board in the form of Word Bank if students seem to be having difficulty.
6. After most have completed the puzzle, follow up with a discussion of the words.

Activity Four (Time: one time segment, approximately 15-20 min.)

1. Use the vocabulary words relating to solid waste management for this group activity.
2. Divide the class into two teams. One contestant from each team is asked to sit in a chair with his or her back to the board. Write one of the vocabulary words on the board so that it can be seen only by the "audience."
3. The team members who can see the words take turns giving either a synonym or short definition of the word to their team's contestant.
4. The team correctly guessing the word gets a point for the word. A new person is then selected to sit in the team chair.
5. Continue with other vocabulary words from the list. The team with the most points is the winner.

LEARNING EPISODE TWO

Skills and Learning Activities:

Observation; vocabulary practice; obtaining information through questioning. Oral language use; written language use; reporting on observations; deductive reasoning; analyzing reports for adequacy of data.

Preparation: Arrange for transportation, adult help, parent permission for visit to sanitary landfill.

Activity (Time: field trip & 30 to 40-min. discussion.)

(This can be carried out on the bus on the way to the landfill, or in the classroom immediately prior to departure.)

1. Today, we are going to see how solid waste is processed and disposed of in our community. Does anyone want to tell us some of the things we are going to see? (Kinds of waste one might find at a landfill, bulldozers and other equipment, piles of earth, etc.)

2. Each of you will have a chance to ask the landfill workers one question. Let's take five minutes to think of a good question to ask. Remember some of the things we know about a landfill.

   a. it is a place where solid waste is collected, compacted and covered with a layer of earth every day. If the layer of earth isn't deep enough, the landfill can turn into an open dump very quickly. Rats might come to eat the organic waste if it was not carefully covered.

   b. open dumps almost always produce leachate -- polluted water that gets into our rivers and lakes. Most sanitary landfills are built so the leachate won't run off or leak into the water under the ground.

   c. the solid waste that is buried in a sanitary landfill contains a lot of recoverable resources that won't be recycled because they are under the ground.

3. Have several students tell the class what they plan to ask the workers at the landfill. If others had planned to ask any of those questions, encourage them to think up new ones. Review the solid waste vocabulary, and encourage them to use it in their questions.

4. Questions that should be included:

   a) How large is the landfill?
   b) How many trucks dispose of solid waste at this landfill daily?
   c) How many tons of solid waste can each truck hold?
   d) Is the landfill owned by the government or by a company? If privately owned, how much does it cost to employ each truck?

e) Does it serve a municipality, county or region?
f) Is there a fee for individuals to bring materials to be disposed of?
g) At what hours (if any) may the public use the landfill?
h) How much did it cost to build the landfill?
i) Number of people this sanitary landfill services in this region.
j) Expected life of this landfill.

Discussion

1. Did everyone get a chance to ask a question. If you didn't, raise your hand and ask it now. Maybe someone in our class can answer it.

2. What did we find out about landfills today? Let's make a list of the new things we learned. (Call on each student in turn and list their suggestions.)

3. Of all that we knew about landfills, and all that we learned today, what are two or three things about a sanitary landfill that make it a good way to dispose of solid waste without hurting the environment. What are the advantages of using a sanitary landfill to dispose of solid waste? (Eliminates air pollution from burning, a common problem in open dumps; relatively inexpensive; when completed, land is available for recreation; etc.)

4. Can we think of some things about disposing of solid waste in a sanitary landfill that are not so good? What are the disadvantages of disposing of solid waste by burying it in a landfill? (Loss of recoverable resources, growing increasingly expensive in some parts of the country as available land becomes scarce; sometimes difficult to keep operating standards up; etc.)

5. Tomorrow, we are going to construct some sanitary landfills of our own and see just what happens to the waste we bury. How many of you think you have a large glass jar at home that you could bring to school for this experiment? How many could bring a shoe box? Can the rest of you bring a large piece of aluminum foil or heavy plastic wrap tomorrow? We will need to line the shoe boxes so the leachate won't run off on the tables. And will some of you please bring some food scraps, pieces of cardboard and a few rags to class tomorrow?

LEARNING EPISODE THREE

Skills and Learning Activities:

Following oral instructions; working in groups; observing and recording; record keeping using forms; oral language use; letter writing; library use; visual reporting.

Preparation: Obtain about a bushel of earth (NOT sterilized potting soil), short pieces of copper wire, broken glass, pieces of plastic, steel and aluminum cans, a box of colored toothpicks, a ball of thin string and an old newspaper. Obtain, or reproduce, enough copies of Appendix F to provide one copy for every fourth child. Notify the librarian of the class's interest in incineration and ask him or her to obtain materials on this subject for the students' use during this learning episode.

Activity One (Time: one time segment, approximately 30-45 min.)

1. Divide the students into groups of four. Provide each group with a glass jar or shoe box, sufficient earth to fill it half way, some food scraps, small pieces of newspaper and cardboard, copper wire, pieces of plastic or glass, two cans, toothpicks and string. Provide each group with a copy of the Data Sheet.

2. Have the students using shoe boxes line them with foil or plastic before filling with earth. Others in the group should divide the waste materials into two identical piles and make labels for each item.

   a. Have the students using shoe boxes plant two identical rows of waste materials, marking each item with a toothpick to which the proper label has been attached with string. Have the group select one member to be the official recorder. That student should list the items buried in the shoe box, in order, on the Data Sheet.

3. Students using glass containers should plant their waste items so that a portion of each item is visible through the glass. They are to mark their waste items as above and select a recorder, who will list the items planted in the glass container in order around the rim.

4. Have each group add a little water to their container. Some of the containers should be kept where they will get sunlight, some out of the light and some near the heating outlet.

5. Instruct the groups which have created their landfills in glass jars to begin watching for signs of decomposition (using a magnifying glass), in about three days. Once they see signs of mold forming, they should make daily observations and have the recorder list their findings on the Data Sheet.

6. The groups using shoe boxes will have to wait for about 10 days before beginning their observations.

Activity Two (Time: one 30-min. time segment for #1-6; one library visit; one 20-min. time segment for #7-8.)

1. We will probably have to wait a few days before the solid waste in our landfill begins to decompose. In the meantime, let's talk about some other methods of disposing of solid waste.

2. Does anyone know if we have any incinerators in our community? (If yes) Where is it? Does it recover energy by burning the solid waste? What happens to the residue, to the materials that do not burn completely? (If no one knows the answers to these questions, suggest the following.)

3. Since we don't know about incineration of solid waste in our community, who could tell us? (Continue discussion until someone suggests the Director of Public Works, or Sanitation Commissioner, or introduce their titles.)

4. If we wrote him letters, I am sure he would be happy to answer our questions. Let's make a list of the most important questions and then write letters asking those questions.

5. Put Director of Public Works' name and address on board, list questions. Allow sufficient time for students to write short letters containing those questions. Collect and mail to DPW.

6. While we are waiting to find out about the incineration of solid waste in our community, there is one other place we can find out more about this method of disposing of refuse, garbage and debris. When we go to the library today, let's see what we can learn from books and magazines.

7. After the library visit, discuss what students have learned from their research. What are the advantages of this method? The disadvantages?

8. Have each student sketch, chart or graph and label one fact he or she has learned about disposing of solid waste by incineration

LEARNING EPISODE FOUR

Skills and Learning Activities:

Observing and recording; using forms, interpreting data. Natural science concepts; oral language use; written language use; deductive reasoning. Reinforcing previously learned concepts.

Preparation: For Activity One, obtain enough magnifying glasses (high magnification) to provide one for each group monitoring a "mini-landfill," candles and laboratory tongs.

For Activity Two, if the Director of Public Works has not had time to respond to the students' letters when this learning episode is taught, call the DPW and obtain answers to the questions contained in the students' letters.

For Activity Three, obtain a bunsen burner or propane torch, various flammable materials (such as cotton, a crust of bread, newspaper, cardboard, rubber, etc.) and laboratory tongs or a similar device.

For Activity Four, retain the materials used in Activity Three, plus a vacuum cleaner, window screen, a piece of filter paper (or tissue paper) and a hand lens or microscope.

Activity One (Time: one time segment, approximately 30-45 min.)

1. Have students remove the waste items in the first row of the shoe boxes (half the items in the jars), one at a time and look at them through the magnifying glass.

   a. Have them record the amount of mold, color and degree of decomposition of each item as it is examined.

   b. If empty spaces appear in the boxes or jar, include in observation form.

2. Initiate a discussion on the experiment.

   a. Which items in the mini-landfills showed the greatest signs of decomposition. (List on board.)

   b. What do these items have in common? (organic wastes, biodegradable)
   c. Which items showed only a few signs of decomposition? Are these also forms of organic waste? Why do you suppose they decompose more slowly than the first group? (greater density, retardents introduced in manufacture, etc.)

   d. Which items showed no signs of decomposition? Can you tell why? Will they remain intact indefinitely? Are they composed of materials that could be considered recoverable resources?

   e. What three conditions exist in our mini-landfills which permit mold to form? (If no one suggests spores, moisture and air, ask what would happen if the mini-landfills had been made of sand and no water had been added? What happens to waste left out on a desert? Suppose the landfills had been made with sterile potting soil? Would the organic wastes have decomposed as quickly? Suppose we had created our landfills in a vacuum? Would the molds have formed? Why not? Is it possible for things to decompose without air? Some spores and bacteria thrive in the absence of air. These are called anaerobic organisms. But they would not act as quickly as aerobic organisms do.

   f. Before they dug their waste items out of the glass jars, could the students see any space around some of the waste items? If so, what do they think caused that space to form? (soil compacting, volume of waste item reduced by decomposition) Does that happen in a full-sized landfill? What is the result of this subsidence? Does the fact that landfills subside have any bearing on what they can be used for after they are completed?

3. Have several students take the materials which showed no signs of decomposition and hold each in turn over the candle flame with the tongs. Have the rest of the class observe and take notes.

   a. Which ones burn, which do not?

   b. Of the ones that burn, which ones give off smoke, which do not?

   c. Which of the ones that give off smoke, or an odor, would cause the most serious forms of air pollution?

   d. Of the items which do not burn, which ones would burn if the heat were as high as that used in a municipal incinerator? If these materials won't burn (glass, steel, copper, aluminum), will they melt when the heat gets high enough? Is there any advantage in melting these items. (Can then be processed for recycling.)

4. Have children write to the sanitary landfill managers, telling what they learned from their experiment, thanking him for helping them understand more about solid waste.

Activity Two (Time: one time segment, approximately 20-30 min.)

1. List the questions on incineration that were covered in the students' letters on the board. Review what was developed through library research.

2. Read the Director of Public Works' letter aloud (or report on information obtained by calling DPW). Discuss any new information.

Activity Three (Time: one time segment, approximately 20 min.)

1. Today we are going to make a mini-incinerator by burning different kinds of solid wastes.

2. Using a bunsen burner or propane torch hold various items (such as cotton material, crust of bread, newspaper, cardboard, rubber, etc.) to the flame, using pliers, forceps, tongs, pie tin, or tray to hold the materials.

3. Keep children a safe distance from the burning items.

4. Discussion:

   a. Is the smell pleasant?
   b. What do you see in the smoke?
   c. Is this a good method of disposing of solid wastes? How can it be improved?
   d. What could be done to an incinerator to make it better? (Stack filters, scrubbers, etc.)

Activity Four (Time: one time segment, approximately 30-40 min.)

1. Recall the outcome of the activities involving burning solid wastes. Tell the class that today's experiment will try to filter the air from the mini-incinerator.

2. Follow the procedures outlined in Activity Three. Next, start a vacuum cleaner, placing a window screen across the hose opening, and a piece of filter paper between the hose opening and the screen. (Tissue will work if filter paper is not available.)

3. As the wastes are burned, allow air from the smoke to be sucked in through the filter paper.

4. After burning various items and filtering the air, examine the filter paper with a hand lens or microscope.

5. Discussion:

   a. What did you see?
   b. What kinds of particles were filtered?
   c. How many different sizes and shapes can you see in the particles?
   d. Where do these particles come from?
   e. Where would these particles have gone if we hadn't filtered the air from our mini-incinerator? Where would they have gone if this had been a real incinerator?

6. Based on what they have learned about sanitary landfills and about incineration, have children vote on which they think is the better method for their community at this time.

7. These are good ways of getting rid of solid waste without hurting the environment, but can we think of a way to get rid of waste that will help the environment? (If no one mentions resource recovery or recycling, introduce the concept.)

8. Looking around the room, can you see any materials which contain resources that could be reclaimed and recycled? (paper, metal, etc.)

9. Can you see anything that might have been made from a recovered resource by recycling? (cardboard, some paper, metal containers, etc.)

10. Have any of you ever collected waste materials for recycling? What did you collect? What did you do with it after you collected a large amount? What did they do with it? What was it used for? Do you know how it was recycled; how it was used to make a new product?

11. Tomorrow, we are going to talk about resource recovery and recycling. When you go home tonight, see if you can find something in your house that has been made of recycled materials. Or see if you can find any pictures or articles about recycling and resource recovery.

LEARNING EPISODE FIVE

Skills and Learning Activities:

Listening skills; oral language use. Supporting arguments; reading aloud; debating opinions.

Preparation: Arrange for someone who is involved in a local citizen reclamation program, or someone from the Department of Public Works, or from the Clean City Committee or other civic organization, to visit the class and talk to the students about resource recovery and recycling. Or obtain the films, "Ecology Lady," "Realities of Recycling" and "Resource Recovery Is..." to show in lieu of a speaker.

Activity One (Time: one time segment, approximately 50-60 min.)

1. Have the students make brief presentations on the recycled item or material on resource recovery and recycling they have brought to class.

   When presentations are made on recycled items, ask the student and the rest of the class to think through how the recovered resource in that item was introduced into the recycling system. Would it have come from a citizen reclamation (recycling) program, or a municipal effort? Who would have bought it from the citizen program or from the city (scrap dealer? manufacturer?)? How would it have been transported from the community in which it was collected to the manufacturer who used it to make a new product? Is it more expensive or less expensive to make things from reclaimed resources than from new resources?

2. Introduce the speaker or the films.

3. Encourage general discussion with the speaker or about the films. Make sure that the question of relative costs of using reclaimed resources and new resources is answered.

Optional Activity

Suggest that the students begin collecting the waste item which is being reclaimed in the community, either by a citizen recycling program, municipal reclamation effort or scrap dealer. If they are interested, help them organize a committee to make the collections, arrange for storage, necessary processing of the materials (bundle newspapers, flatten cans, etc.), transportation to the reclamation point and record keeping.

Activity Two (Time: one 30-min. time segment)

1. Pretend that you have just been elected mayor of your city.

2. One of your first jobs will be to solve the city's solid waste problems.

3. Write a newspaper article telling what the problems of solid waste management are in your city and how you intend to correct the problems.

Activity Three (Time: one 25-min. time segment)

1. We have learned a good deal about three methods of managing solid waste in an environmentally sound manner. Now, I would like you to decide for yourself, based on your own knowledge and opinions, which method would be best for your community.

2. When you have decided, I would like you to write the name of that method at the top of a page and then give three reasons why, in your opinion, that would be the best method for our community. If there are any disadvantages, list them, too.

3. Have several students collect the papers and count them as ballots to determine which method is preferred by the most students.

4. Have several other students read the ballots of the preferred method aloud.

   Ask students who voted for one of the methods to tell what was on their ballots and why they disagreed with the choice of the other students. (Emphasize that each individual must come to his or her own conclusion on the issue, and that while some actions may be preferable under certain circumstances, there is no blanket solution to solid waste problems.)

5. Have students complete the observations on their mini-landfills.

EVALUATION INSTRUMENT

The following two pages contain the evaluation instrument for the Fifth Grade unit. It should be administered during the first time segment of the unit, and about a week after the completion of Learning Episode Five.

Photocopy the evaluation tool so there will be one for each student.

Answers

I.
1. b
2. a
3. c
4. b
5. c
6. c

II.
circle: incineration
recycling
burying in sanitary landfills

III.
1. d
2. g
3. j
4. b
5. h
6. c

Name______________________________ Class________________

I. CIRCLE THE LETTER PRECEDING THE PHRASE THAT BEST COMPLETES EACH STATEMENT.

1. The "Third Pollution" is:

   a. noise
   b. mismanaged solid waste
   c. population
   d. pesticides

2. Incinerate means:

   a. dispose of by burning
   b. energy recovery
   c. put in jail
   d. none of the above

3. A sanitary landfill is:

   a. an open dump
   b. a junkpile
   c. a place where trash is buried
   d. a construction site

4. Waste materials that decompose quickly are:

   a. biospheres
   b. biodegradable
   c. bionic
   d. bilateral

5. Resources recovered from solid waste and used to make new products are called:

   a. ores
   b. natural resources
   c. recycled materials
   d. metals

6. Decompose means:

   a. get nervous
   b. be happy
   c. rot
   d. loud music

II. CIRCLE THREE METHODS OF PROCESSING OR DISPOSING OF SOLID WASTE:

LEACHATE INCINERATION RECYCLING

BURYING IN SANITARY LANDFILLS SAVING NATURAL RESOURCES

III. IN EACH BLANK, INSERT THE LETTER FOR THE PHRASE WHICH BEST COMPLETES THE STATEMENT.

1. One advantage of disposing of solid waste through incineration is ______.
2. One disadvantage of disposing of solid waste through incineration is ______.
3. One advantage of disposing of solid waste by burying it in a sanitary landfill is ______.
4. One disadvantage of disposing of solid waste by burying it in a sanitary landfill is ______.
5. One advantage of reclaiming solid waste by recycling it is ______.
6. One disadvantage of reclaiming solid waste by recycling it is ______.

a. it attracts flies
b. it can produce leachate
c. the possibility of not being able to sell the materials if the market "dries up"
d. the reduction in the volume of solid waste
e. it makes too much noise
f. the garbage ends up on the streets
g. possible air pollution
h. reuse of resources
i. it eliminates the need for litter receptacles
j. the land may eventually be used for recreation

Appendix A

Student Worksheet

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*	*o*	*p*
1.	B	I	O	D	E	G	R	A	D	A	B	L	E	M	T	R
2.	O	N	S	U	G	A	R	X	I	C	O	I	L	E	H	U
3.	X	C	G	M	G	R	A	G	S	O	T	T	K	T	I	N
4.	O	I	A	P	S	B	T	O	P	V	T	T	E	A	R	O
5.	O	N	S	T	E	A	M	R	O	E	L	E	L	L	D	F
6.	Z	E	N	E	R	G	Y	E	S	R	E	R	I	R	P	F
7.	E	R	T	I	R	E	S	C	E	U	S	E	D	A	O	E
8.	S	A	N	I	T	A	R	Y	L	A	N	D	F	I	L	L
9.	M	T	S	A	N	D	Z	C	A	N	S	E	O	N	L	E
10.	O	E	A	R	T	H	G	L	A	S	S	C	O	S	U	C
11.	L	E	A	C	H	A	T	E	K	W	O	O	D	X	T	T
12.	T	O	Z	E	A	L	U	M	I	N	U	M	E	I	I	R
13.	R	E	C	O	L	O	G	Y	W	P	A	P	E	R	O	I
14.	A	Q	C	A	R	D	B	O	A	R	D	O	P	O	N	C
15.	S	O	L	I	D	W	A	S	T	E	K	S	U	N	X	I
16.	H	R	R	E	S	I	D	U	E	S	T	E	E	L	Z	T
17.	R	E	S	O	U	R	C	E	R	E	C	O	V	E	R	Y

Appendix Aa

Answer Sheet

ACROSS

1. BIODEGRADABLE
2. ON, SUGAR, OIL
3. RAGS, TIN
4. TOP, TEAR
5. STEAM
6. ENERGY
7. TIRES, USED
8. SANITARY LANDFILL
9. SAND, CANS
10. EARTH, GLASS
11. LEACHATE, WOOD
12. ALUMINUM
13. ECOLOGY, PAPER
14. CARDBOARD
15. SOLID WASTE, SUN
16. RESIDUE, STEEL
17. RESOURCE RECOVERY

DOWN

a. BOX, OOZES, TRASH
b. INCINERATE, ORE
c. GAS
d. DUMP
e. EGGS
f. GARBAGE
g. RAT, BAD
h. RECYCLE
i. DISPOSE, WATER
j. COVER
k. BOTTLES
l. LITTER, DECOMPOSE
m. LID, FOOD, DEEP
n. METAL, RAIN, IRON
o. THIRD POLLUTION
p. RUNOFF, ELECTRICITY

Appendix B

Fifth Grade

RESOURCE RECOVERY

*taking usable materials out of solid waste,
usually through high-technology processes*

SANITARY LANDFILL

a large, outdoor area for waste disposal where discarded materials are usually compacted before being covered with a layer of earth; a place to bury solid waste

INCINERATE

*reduce the amount of waste to be disposed of
by burning it*

RESOURCE RECOVERY

*taking usable materials out of solid waste,
usually through high-technology processes*

SANITARY LANDFILL

a large, outdoor area for waste disposal where discarded materials are usually compacted before being covered with a layer of earth; a place to bury solid waste

INCINERATE

*reduce the amount of waste to be disposed of
by burning it*

Appendix Bb

Fifth Grade

SOLID WASTE: *all useless, unwanted or discarded materials*

SOLID WASTE: *all useless, unwanted or discarded materials*

SOLID WASTE: *all useless, unwanted or discarded materials*

RESOURCE: *something that can be used to make something out of something else*

RESOURCE: *something that can be used to make something out of something else*

RESOURCE: *something that can be used to make something out of something else*

DISPOSE: *get rid of an unwanted item or items*

DISPOSE: *get rid of an unwanted item or items*

DISPOSE: *get rid of an unwanted item or items*

WASTE PROCESSING: *doing something to discarded materials so they can be handled more easily (incineration) or so resources can be recovered from them (recycling)*

Appendix Bb

Page Two

WASTE PROCESSING:	*doing something to discarded materials so they can be handled more easily (incineration) or so resources can be recovered from them (recycling)*
RESIDUE:	*what is left after waste has been incinerated or after all the recoverable resources have been taken out*
RESIDUE:	*what is left after waste has been incinerated, or after all the recoverable resources have been taken out*
RECYCLING:	*using materials recovered from solid waste to make new things*
DECOMPOSE:	*to break down to basic elements; to rot*
BIODEGRADABLE:	*material which decomposes naturally*
LEACHATE:	*water which has drained through something (usually, solid waste), dissolved some of that material and become polluted as a result*
ENERGY RECOVERY:	*incinerating solid waste in such a way that the heat from the burning process can be used to make steam for heating, cooling and/or to make electricity*

Appendix C

CROSSWORD PUZZLE CLUES

ACROSS:

1. To get rid of unwanted items.

3. All useless, unwanted or discarded materials.

5. To break down to basic elements; to rot.

7. To pack closely together.

9. Water which has drained through something and become polluted as a result.

11. Using materials recovered from solid waste to make new things.

13. Something that can be used to make something else.

15. Doing something to discarded materials so they can be handled more easily (compacted, incinerated) or so resources can be recovered from them (recycling).

DOWN:

2. Reduce the amount of waste by burning.

4. This kind of waste was once living.

6. Everything that has to be done to get rid of all the waste that is produced by the community. This includes collecting it, transporting it, and, finally, processing it in one way or another.

8. A large outdoor area for waste disposal where discarded materials are usually compacted before being covered with a layer of earth.

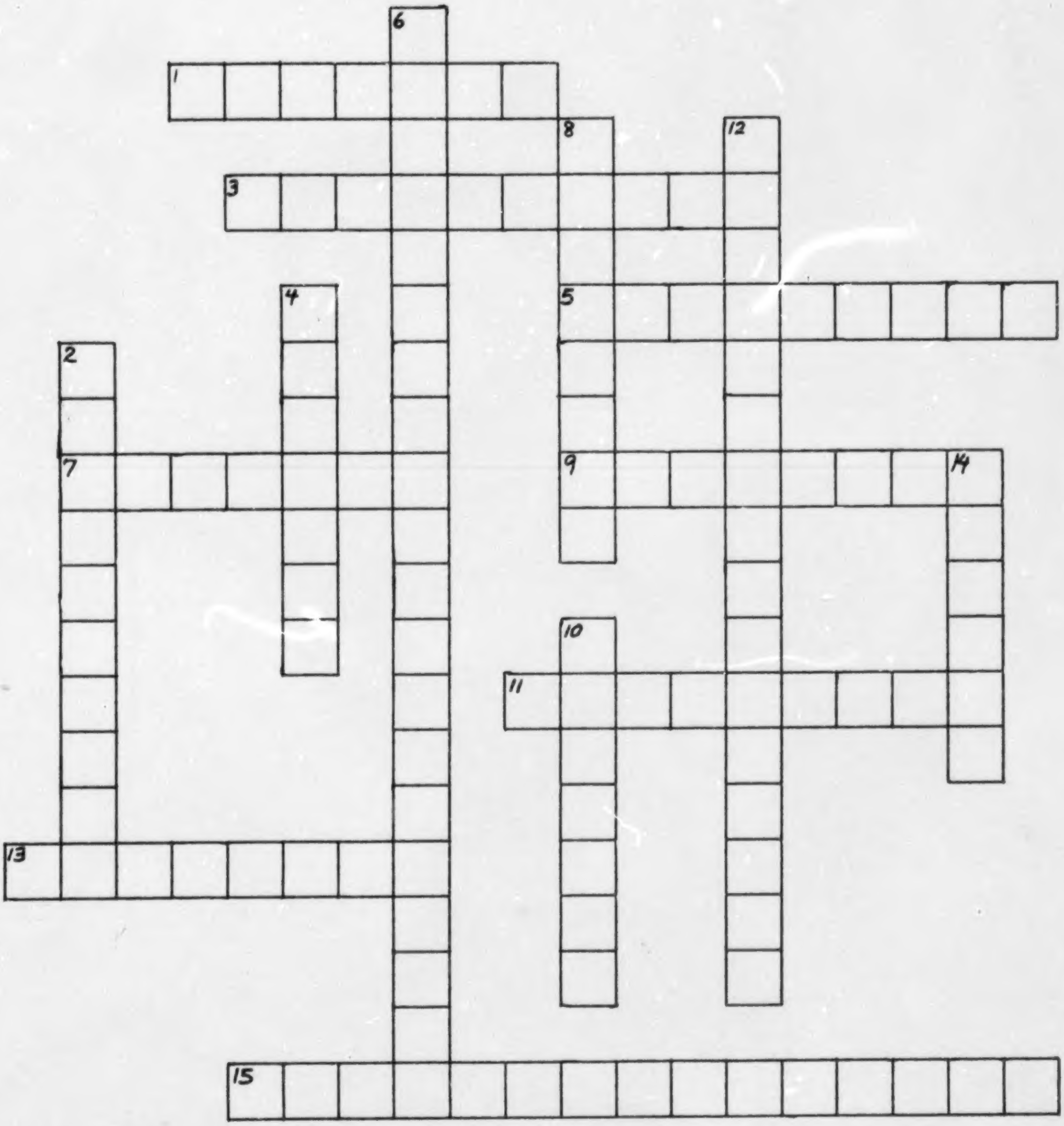
10. What is left after waste has been incinerated, or after all the recoverable resources have been recovered.

12. Taking usable materials or energy out of solid waste.

14. Power, which can be in several forms: steam, electrical, atomic, chemical, human, etc.

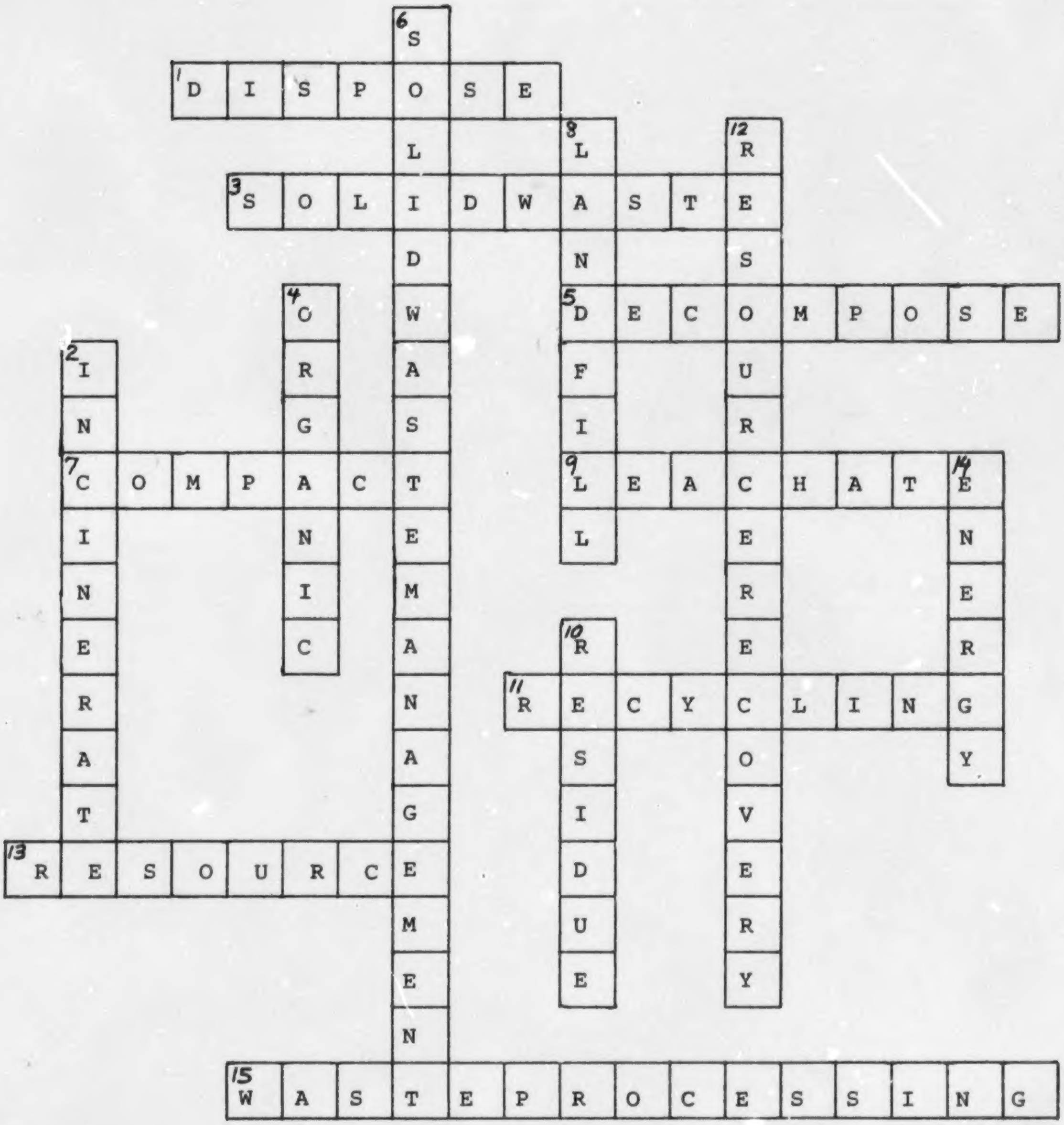
Appendix D

Crossword Puzzle


6
1
8
12
3
4
5
2
7
9
14
10
11
13
15

Appendix E

Answers - Crossword Puzzle


1 DISPOSE
2 INCINERATE
3 SOLIDWASTE
4 ORGANIC
5 DECOMPOSE
6 SOLIDWASTEMANAGEMENT
7 COMPACT
8 LANDFILL
9 LEACHATE
10 RESIDUE
11 RECYCLING
12 RESOURCERECOVERY
13 RESOURCE
14 ENERGY
15 WASTEPROCESSING

Appendix F

DATA SHEET FOR "MINI-LANDFILL"

Date of planting ____________

Name of garbage items in first row	Observations after first week	Name of garbage items in second row	Observations after second week	Names of items in additional row	Observations after third week

RESOURCE MATERIALS

FIFTH GRADE

A. Audio-Visual Aids

Films:

1. "A Decent Burial" (12 min.) - Explains the simplicity, effectiveness and economy of the sanitary landfill method of refuse disposal. Contact: Modern Talking Picture Service, New York.

2. "A Place to Begin" (13½ min.) - The citizens of Macon, Ga., speak about how the CLEAN COMMUNITY SYSTEM (Keep America Beautiful, Inc.'s behavioral approach to changing attitudes about the handling of waste) worked in their city. Contact: Keep America Beautiful, Inc., New York.

3. "Ecology Lady" (15 min.) - Problems of a neighborhood recycling center. Contact: Stuart Finley, Inc., Falls Church, Va.

4. "Resource Recovery Is..." (20 min.) - Major approaches to recovery of resources, featuring communities already employing these methods. Contact: Modern Talking Picture Service, New York.

5. "The House That Recycling Built" (9½ min.) - Shows how products of recycled materials were used in building a home. Contact: Reynolds Metals Company, Richmond, Va.

6. "The Trouble With Trash" (28 min.) - Refuse problems and solutions are shown and discussed. Contact: Modern Talking Picture Service, New York.

7. "To Four Parts Refuse" (15 min.) - Describes a well-planned landfill. Contact: NACD, Distribution Branch, National Audiovisual Center (GSA), Washington, D.C.

8. "Wealth Out of Waste" (20 min.) - Explains secondary recovery techniques presently in use or experimentally in operation throughout the United States. Contact: Bureau of Mines, U.S. Department of the Interior, Washington, D.C.

B. Bibliography

Teacher/Student:

1. Asimov, Isaac. ABC's of Ecology, Walker & Co.: New York (1972).

2. Jones, Claire; Gadler, Steve; and Engstrom, Paul. Pollution: The Land We Live On, Lerner Publications Co.: Minneapolis (1974).

3. Shanks, Ann Zane. About Garbage and Stuff, The Viking Press: New York (1973).

KEEP AMERICA BEAUTIFUL

A NEW SEQUENTIAL CURRICULUM
COVERING THE BEHAVIORAL ASPECTS
OF WASTE MANAGEMENT
FOR GRADES K-6

WASTE IN PLACE

6

SIXTH GRADE UNIT

SIXTH GRADE

6 SIXTH GRADE UNIT

PURPOSE

The cumulative series of seven study units constituting the "Waste In Place" curriculum is designed to help elementary school children understand how their own habits affect the environment of their homes, schools and communities and to make them aware of the relationship between their own behavior -- and that of those around them -- and the total physical quality of life.

Solid waste is a major environmental problem in most areas of the country. Loose refuse degrades the aesthetic environment, contributes to water pollution, and is often a health hazard. Disposing of solid waste in an environmentally sound manner is becoming increasingly difficult as space for sanitary landfills runs out and pollution-free incineration becomes more costly. Resource recovery offers an excellent solution in areas where sufficient solid waste is generated to make this economically practical, but such a solution makes it even more important to insure that all waste is containerized and kept in the reclamation system.

There may be little the elementary school child can do to solve air and water pollution problems, but even a five-year-old can learn to handle refuse properly and to understand the relationship between his or her action and the quality of the environment in which he or she lives.

Older students can begin to appreciate how attitudes and habits affect the decision-making process in dealing with solid waste and, by extrapolation, in dealing with other issues of community concern.

In this Sixth Grade unit of "Waste In Place," this appreciation will be instilled through a simulation game, in which the class will assume the roles of various members of a fictional community that must reexamine the processes through which it manages its solid waste (because of the limited space now remaining in the town's sanitary landfill).

Simulation games offer children highly motivating learning experiences through participation in role playing situations. For many years, simulation devices have been used successfully by governmental agencies, businesses and other organizations. This technique offers the learner a "hands on" experience with a simulated problem and demands careful evaluation of alternatives and suggested solutions to that problem. These games enable children to portray and interpret the human relationships taking place daily, and allows teachers to observe behaviors which reveal the attitudes and values of their students.

CONCEPT

Intelligent decision-making requires consideration of all available options, and the facts relating to those options, including an understanding of the normative system (the network of attitudes and habits) surrounding the issue in a given community.

OBJECTIVES

To enable each student to:

1. Identify three types of containers used to store or transport solid waste.
2. Locate two waste collection points on the school campus.
3. Identify two problems confronting sanitation workers on their daily rounds.
4. Cite the advantages and disadvantages of three methods of solid waste disposal.

EVALUATION

Test the students' knowledge of solid waste management concepts and practices before initiating unit. (The test instrument is included below, pg. 6-15). Administer the same test a week after completing the unit. Score and record each student's results individually each time the test is administered.

TIME

Depending on the classroom structure, the teacher and the speed with which students learn the various concepts, this unit should take approximately 13 time segments over a period of three weeks (plus time for administering the Evaluation Instrument one week after the completion of the final Learning Episode).

The first day's time segment will be devoted to administering the Evaluation Instrument.

Learning Episode One (probably spread over two days):
- one 30 to 40-min. time segment for discussion
- one 20 to 30-min. time segment for activity

Learning Episode Two (preferably all in one day):
- one 20-min. time segment prior to visiting the community's sanitary landfill
- visit to the landfill
- one 40-min. time segment after visiting the landfill for discussion

Learning Episode Three (preferably all in one day):
  - one 20-min. time segment prior to the visit by sanitation workers
  - visit by, and interviewing of, the sanitation workers; examining their vehicles and equipment
  - one 40-min. time segment after the visit for discussion

Learning Episode Four (preferably all in one day):
  - one 20-min. time segment prior to the visit by the representative of the community's recycling/resource recovery facility
  - visit by this representative
  - one 40-min. time segment after the visit for discussion

Learning Episode Five (two days):
  - one 45-min. time segment for report of the "Legal Committee"
  - one 45-min. time segment for report of the "Equipment Committee"

Learning Episode Six (two days):
  - one 45-min. time segment for report of the "Disposal Methods Committee"
  - one 45-min. time segment for report of the "Temporary Landfill Siting Committee"

Learning Episode Seven:
  - one or more periods over a week's time to allow the Committees to complete their assignments

Learning Episode Eight:
  - one time segment, approximately 60-90 min.

Learning Episode Nine:
  - one time segment, approximately 60-90 min.

Then, approximately one week after completing Learning Episode Nine, a time segment must be set aside to re-administer the Evaluation Instrument.

NOTE: "Waste In Place" is designed to be a cumulative curriculum, with this unit as the concluding Episode. Teachers participating in the field test might want to use some or all of the Learning Episodes in the previous (Fifth Grade) unit as background before introducing Learning Episode One of this unit or to intersperse the appropriate Learning Episodes as this unit is taught.

VOCABULARY

BIODEGRADABLE	- material which decomposes naturally.
COMPACT	- to pack closely together.
COMPACTOR	- a machine which compacts solid waste.
DECOMPOSE	- to break down into basic elements; to rot.
DISPOSE	- get rid of an unwanted item or items.
DUMPSTER	- a large waste storage container, emptied by specially equipped vehicle.

ENERGY	- power, which may be in several forms: steam, electrical, atomic, chemical, human, etc.
ENERGY RECOVERY	- incinerating waste in such a way that the heat from the burning process can be used to make steam for heating, cooling and/or to make electricity.
INCINERATE	- reduce the amount of waste to be disposed of by burning it.
LEACHATE	- water which has drained through something (as used here, through accumulated solid waste), dissolved some of the material and become polluted as a result.
ORGANIC WASTE	- once living material that is now useless -- eggshells, coffee grounds, leaves, grass clippings, food scraps.
RECYCLING	- using materials recovered from solid waste to make new things.
RESIDUE	- what is left after waste has been incinerated, or after all the recoverable resources have been taken out.
RESOURCE	- something that can be used to make something else -- wood into paper, iron ore into steel, bauxite into aluminum, sand into glass, old newspaper into cardboard, old cans and bottles into new ones.
RESOURCE RECOVERY	- taking usable material (resources), out of solid waste, usually through high-technology processes. (What is not usable still has to be disposed of.)
SANITARY LANDFILL	- a large outdoor area for waste disposal where discarded materials are usually compacted before being covered with a layer of earth; a place to bury solid waste.
SEWAGE	- liquid and solid wastes carried off with ground water in sewage and drains.
SIMULATION	- pretend; act out an imaginary situation.
SOLID WASTE	- all useless, unwanted or discarded materials -- refuse, trash, garbage, debris.
SOLID WASTE MANAGEMENT	- everything that has to be done to get rid of all the waste produced in the community.
TRANSFER STATION	- a place or facility where waste is taken from smaller trash collection vehicles and placed in larger ones for transporting to disposal area. (Sometimes,compacting is done here.)

VISUAL BLIGHT	- to cause decline or decay in a community's appearance, by littering or in other ways.
WASTE PROCESSING	- doing something to discarded materials so they can be handled more easily (compacting, incineration), or so resources can be recovered from them (recycling).

LEARNING EPISODE ONE

Skills and Learning Activities:

Oral language skills; reporting from memory, analyzing recalled data. Reading comprehension, following instructions.

Optional Preparation:	Teach Learning Episode One (solid waste vocabulary) from Unit VI (Fifth Grade).
Required Preparation:	Reproduce sufficient copies of Appendix A and map to provide one for each student; sufficient copies of Appendices B, C, D and E to provide copies of each for one-fourth of the class.

Discussion (Time: one time segment, approximately 30-40 min.)

1. When we talk about "waste management," what do we mean? (Everything that has to be done to get rid of all the waste in a community.)

2. Who can tell me where solid waste is generated -- where many things are used and have to be discarded -- here in school? (Classroom, cafeteria, etc.) Who can tell me where most solid waste is generated in our homes? (Kitchen) In our neighborhoods?

3. Let's think about the solid waste in our homes. What steps do we have to take to get rid of it? How do we manage it? (Empty all household containers into large, weatherproof container, etc.)

4. Once it is outside our houses, does anyone know what happens to it? Can anyone tell us, step-by-step, where it goes and how it gets there. (Pick-up by sanitation workers in collection vehicles -- compactors, in many communities -- transported to transfer station, or directly to disposal site.)

5. How many people do you think it takes, including the people in your house who help to get the garbage and trash (the solid waste) ready for collection, to get rid of your family's solid waste?

6. Can anyone tell us what kind of equipment is used to get rid of your family's solid waste? What do the sanitation workers use to pick it up? What is it carried in?

7. Does anyone know how we dispose of solid waste in our community?

8. Does anyone know any other methods of disposing of solid waste, ways to get rid of it without hurting the environment?

9. What would happen to our city (town) if we didn't "manage," solid waste -- if we just threw it in the street the way people did hundreds of years ago? What would our city look like? What would our city smell like? What would happen to our health if all our solid waste, all the trash and garbage and debris from every house and business was just thrown out?

10. Now, can anyone tell me why it is very important to manage solid waste properly?

Activity (Time: one time segment, approximately 20-30 min.)

1. Hand out Appendix A and the map.

   For the next few weeks, we are going to find out how waste is managed in our community, and what other ways there are for stopping it, collecting it and disposing of it in a way that won't hurt the environment. To help us learn, we are going to play a simulation game. Can anyone tell me what kind of game that is? (Continue discussion or introduce concept of "pretending.")

2. For the next few weeks we are going to pretend that we live in Glen City. The Information Sheet I just handed out tells you about "Glen City." The map shows you what it looks like. (Allow five minutes for class to read Information Sheet.)

3. We are going to pretend that Glen City needs a new way to manage solid waste. They have been using a sanitary landfill, but there is only a little room left in that landfill. A new landfill, or a new way of getting rid of Glen City's waste, will be needed pretty soon. We also need to keep our city cleaner, to keep waste from escaping containers and becoming litter. And we want to save money.

   We are going to pretend that this class has been asked to decide just what should be done. Some of us will pretend to be research committee members, people who have to get all the information about various parts of waste management and make suggestions to the City Council about what Glen City should do with its waste. A few of us will pretend to be City Council members, the people who must decide what is the best way. They will listen to what the research committees suggest, and then they will say what is going to be done.

4. The research committees are:

   a. The Legal Committee. Its job is to find out what rules Glen City has about solid waste management. These rules should help people have good habits about handling waste. If they don't, maybe Glen City needs some new laws. (Appendix B)

b. The Equipment Committee. Its job is to find out what kinds of containers Glen City needs to make sure that no solid waste escapes while it is being stored, or collected, or taken to where it will be disposed of. (Appendix C)

c. The Disposal Methods Committee. Its job is to find out what is good and what is not so good about the various methods available for getting rid of waste without hurting the environment. (Appendix D)

d. The Temporary Landfill Siting Committee. We are pretending that there isn't enough time for Glen City to just go ahead and do something new. We will need a place to dispose of solid waste for a while, to give us time to build a permanent place. This committee will suggest a place and a design for the new landfill. (Appendix E)

5. If possible, let students choose the committee on which they prefer to serve. Give each a copy of the responsibilities list for that committee.

6. Review the responsibilities list with each group, in turn, making sure everyone understands what is expected of his or her committee.

7. Set a schedule for carrying out the various responsibilities for each committee.

8. Remind the class that while they are pretending to live in Glen City, they will be getting information about waste management in their own city. They are to pretend that it is true about Glen City, too.

Optional Activities

1. Create a vocabulary list (see pp. 6-2 and 6-3), and distribute list to students. Review terms until class is familiar with them all.

2. Ask students to write a short story about an area of the community where proper solid waste management is not being practiced, and the effect that this has had on the neighborhood's appearance.

LEARNING EPISODE TWO

Skills and Learning Activities:

Reading for comprehension; following instructions. Observation; acquiring data through questioning; recording observations. Recalling data; written language use. Data analysis; oral language use; drawing conclusions; achieving consensus.

Preparation: Arrange to take the class to the landfill. The night before, remind each committee to review its responsibilities sheet.

Activity One (Time: approximately 20 min., prior to landfill tour)

1. Allow 10 minutes for the committees to meet and draw up their questions for the landfill operator.

2. Have a representative of each committee read its questions aloud. Make a list on the board. Ask the class if there are any other questions that should be asked of the landfill operator. Add them to the list. Leave the list on the board. (Although students may have visited a landfill in a previous class, their questions should reflect the research being done for the Glen City simulation game. This visit should provide greater insight for students.)

Activity Two (Time: as needed)

Visit landfill.

Activity Three (Time: one time segment, approximately 40 min.)

1. Immediately following the trip to the landfill, have each student write down the answers to the questions on the board. Permit students to use their notes, but do not permit oral consultation.

2. Have one or more students read answers to the questions.

   a. ask if anyone has anything to add to the answers read out aloud.
   b. encourage discussion and comments about the questions and answers.

3. Ask if anyone has any new questions about sanitary landfill operations that were not asked during the field trip. If other students cannot answer these questions, ask the Disposal Methods Committee to make a note of them, and to try to find the answers during their "literature search."

LEARNING EPISODE THREE

Skills and Learning Activities:

As in Episode One.

Preparation: Arrange with the Sanitation Department or the Clean City Committee to have sanitation workers bring the greatest possible variety of sanitation equipment, including household, commercial and street containers, to the school, to explain to students what each piece is used for and to demonstrate how it works. Remind students to review their Committee Responsibilities lists.

Activity One (Time: approximately 20 min., prior to visit by sanitation workers)

1. Allow 10 minutes for the committees to meet and draw up their questions for the sanitation workers. (Encourage students to think about special problems that sanitation workers might face in their daily rounds.)

2. Have a representative of each committee read its questions aloud. Make a list on the board. Ask the class if there are other questions that should be asked of the sanitation workers. Add them to the list. Leave the list on the board.

Activity Two (Time: as needed)

Inspect equipment. Interview sanitation workers.

Activity Three (Time: one time segment, approximately 40 min.)

1. Immediately following the interviews with sanitation workers, have each student write down the answers to the questions on the board. Permit students to use notes, but do not permit oral consultation.

2. Have one or more students read answers to the questions.

   a. ask if anyone has anything to add to the answers read aloud.
   b. encourage discussion and comments about the questions and the answers.

3. Ask if anyone has any new questions about sanitation equipment or practices that were not covered in discussion with sanitation workers. If other students cannot answer these questions, ask the Equipment Committee to make a note of them and to call their contact at the Sanitation Department or the Clean City Committee to get the answers.

LEARNING EPISODE FOUR

Skills and Learning Activities:

As in Episodes One and Two.

Preparation: Through the Sanitation Department or the Clean City Committee, arrange to have someone visit the class to talk about reclamation (citizen or municipal programs) and resource recovery, or arrange to show the films listed at the end of the unit.

Activities One, Two and Three (Time approximates those above.)

As in Learning Episodes Two and Three.

LEARNING EPISODE FIVE

Skills and Learning Activities:

Organizing data; oral language use. Good listening skills, deductive reasoning, group participation.

Preparation: Review responsibilities listed in Appendices B and C with Legal and Equipment Committees. Instruct members to be prepared to discuss their progress on the following day or later in the week.

Activity One (Time: one time segment, approximately 45 min.)

1. Ask one member of the Legal Committee to report on the regulations covering waste management now in force in the community.

2. Ask another member to report on which of these regulations are generally observed and enforced when necessary. Have student describe how these regulations are enforced.

3. Initiate a class discussion on the need for these particular regulations in terms of:

   a. number of people living in particular areas in the community.
   b. cost of collection of uncontainerized refuse.
   c. health factors.
   d. feelings of residents in areas where these regulations are observed and enforced.
   e. feelings of residents in areas where these regulations are ignored.

4. Ask another member of the Legal Committee to report which regulations are generally unenforced and ignored.

5. Initiate class discussion on why these regulations are not enforced or observed. Possible reasons might be:

   a. lack of public awareness that these rules exist.
   b. waste handling habits in the community that would have to be changed if rules were enforced.
   c. prevailing attitudes that sound waste management is not very important.

6. Continue discussion by asking class for suggestions of ways in which people might be encouraged to observe sensible waste management regulations.

Activity Two (Time: one time segment, approximately 45 min.)

1. Ask one member of the Equipment Committee to report on the types of containers and sanitation equipment they found being used in the community.

2. Ask another member of the committee to report on any problems sanitation workers have in doing their jobs properly.

3. Initiate class discussion on what might be done to help overcome the problems sanitation workers face. Possible suggestions:

   a. install more litter receptacles in areas of high pedestrian traffic.
   b. have people put their household solid waste out on the curb instead of making sanitation workers go to the back of the house to pick up the trash and garbage.
   c. encourage apartment owners to install a dumpster for residents to use, instead of individual containers for each family.
   d. have the city buy bigger compactor trucks, so sanitation workers could pick up more waste between trips to the disposal site.

LEARNING EPISODE SIX

Skills and Learning Activities:

As in Episode Four.

Preparation: Review responsibilities listed in Appendices D and E with the Disposal Methods and Temporary Landfill Siting Committees. Instruct members to be prepared to discuss their progress the following day or later in the week.

Activity One (Time: one time segment, approximately 45 min.)

1. Ask one member of the Disposal Methods Committee to describe its "literature search." Is there much information on waste disposal methods in the usual magazines and newspapers in the school and public libraries? Is this a subject most people know a lot about?

2. If the Committee members were able to locate waste management trade publications or professional journals, what was their impression of the job of waste management?

   a. Is handling solid waste an easy job? Did they get the impression that it takes trained and dedicated people to manage waste well?
   b. Do they think most people care about having waste managed properly? Did any of their research, in print or in talking to people, indicate that sometimes people get very upset when a city tries to change its waste management practices. If so, can the class suggest things that might be done to keep people from getting upset when waste management practices are changed.

3. Did the members of the other committees learn anything about waste disposal methods that the Committee should be aware of? If so, list on board.

Activity Two (Time: one time segment, approximately 45 min.)

1. Ask a member of the Temporary Landfill Siting Committee to report on what the Committee members' parents, other adults said they would feel if the landfill were put in their neighborhood.

2. Have other members of the Committee go through the list of questions they were supposed to have asked their parents and tell what their parents said they would feel and what they would do.

3. Ask the class what might be done to help keep people from getting upset or angry when landfills and transfer stations have to be built and trucks have to be routed to get to them. Possible suggestions:

   a. Let everyone in the city help decide where the landfill will go.
   b. Show people films or pictures of landfills that are fenced and screened with bushes and shrubs so that they do not spoil the looks of the neighborhood.
   c. Work out schedules so that the trucks don't go through the neighborhood too often.
   d. Make sure that everyone knows that the landfill will be turned into a beautiful park, with recreation facilities, in just a few years.

LEARNING EPISODE SEVEN

Skills and Learning Activities:

Working independently of the teacher; research techniques; analyzing options; exercising choice; achieving consensus.

Preparation: If necessary, arrange for two or three parents, or other interested adults, to come into the classroom for a 90-minute period (or periods), to assist the individual committees with their data-gathering tasks, analysis and consensus development.

Activity (Time: as needed)

Set aside one or more periods over a week's time for the Committees to complete the tasks set forth on their responsibilities lists.

LEARNING EPISODE EIGHT

Skills and Learning Activities:

Role playing; formal oral presentation; good listening skills; quick recall and data organization.

Activity (Time: one time segment, approximately 60-90 min.)

1. Have each Committee draw straws among its members to select one to play the role of a "City Council Member."

2. Let the selected students choose the role they will play (or assign):

   a. City Council President: This person is the president of the bank. He wants to see Glen City grow but knows that it will not continue to grow if it isn't a clean, pleasant, environmentally sound community.
   b. Council Member Jones: This person is worried about taxes. He or she wants a clean, pleasant, environmentally sound city, but only if it won't cost any money.
   c. Council Member Smith: This person doesn't pay attention, never remembers what has been said. Keeps asking questions that have already been answered.
   d. Council Member Green: This person wants to be sure that whatever is decided is the best decision which could be made. He or she wants all the details, wants to know the disadvantages as well as the advantages, will accept some disadvantages if they are not too bad.

3. Have the Council members go up to the front of the room and sit in a row. The Council President says, "This meeting will now come to order. We are going to hear recommendations from the four Committees that have been studying Glen City's solid waste management needs. Council members will let each Committee finish its presentation before asking any questions. The first Committee to report will be the Legal Committee."

4. Have the Committee report in whatever manner they have agreed upon among themselves. When they have finished, encourage the "Council members" to ask questions. Prompt such, if necessary.

5. Follow this procedure with each Committee in turn.

6. When all the Committees have completed their reports, allow the "Council members" to ask more questions if they are so inclined.

7. When all the "Council's" questions have been answered, have them make individual lists of the recommendations they favor, but instruct them not to discuss their votes with the other members of the class.

LEARNING EPISODE NINE

Skills and Learning Activities:

Good listening skills; performance analysis; oral language use.

Preparation: Meet with the "Council Members" out of hearing of the rest of the class. Help them achieve consensus on the recommendations they favor, but do not urge them to adopt all the recommendations. Have the "Council President" write out the list of accepted recommendations to read to the rest of the class.

Activity (Time: one time segment, approximately 60-90 min.)

1. Have the Council President read the list of recommendations adopted by the Council. If some of the recommendations were not accepted, have other Council members tell the class why.

2. Initiate a discussion on the Council's decision by asking the following questions:

    a. How did you feel about simulation game?
    b. Did it help you to work better with your classmates?
    c. What are some of the things that you learned about solid waste management?
        1) About how your personal decision affects the lives of other people?
        2) About how you personally have to bend in your opinion at certain times to work with other people, such as your fellow committee members?
    d. Did you like Council's decision?
    e. Did you agree with the parts of your proposal that they accepted?
    f. Were you upset in any way about the parts of your proposal they didn't accept?
    g. Do you feel that the parts that were left out would have made Glen City's solid waste program better?
    h. Did you feel comfortable in making your presentation?
    i. Did you have enough background information to make a good presentation?

3. Continue this line of discussion as long as necessary, letting students comment and evaluate the effectiveness of this project.

EVALUATION INSTRUMENT

The following two pages contain the evaluation instrument for the Sixth Grade unit. The evaluation instrument should be administered during the first time segment of the unit, and re-administered about a week after completing the final Learning Episode.

Photocopy the two pages of the evaluation tool so there will be enough for each student, and staple the pages together.

Scoring (total: 100 points)

Score five points for each correct answer for questions 1, 2, 3, 4, 5, and 6. (Possible score: 65 points)

Score five points for each correct answer for questions 7, 8, 9, 10, and 11. (Possible score: 25 points)

Allow a maximum of 10 points for the essay.

Answers

1. LITTER RECEPTACLES, DUMPSTERS and COMPACTOR TRUCKS should be circled.

2. (Response will depend on the particular circumstances of the school -- likely places would be the cafeteria kitchen, the maintenance room, dumpsters, classroom waste baskets, hallway waste baskets, etc.)

3. Responses might include:

   -- garbage that is not put into the proper containers for collection
   -- garbage that is put into uncovered containers
   -- dogs (including those that rip open plastic bags in which trash is stored)
   -- equipment breakdowns
   -- below-ground receptacles (require extra effort to lift)
   -- poor public image of the sanitation worker

4. Advantages of a sanitary landfill:

   -- eventual re-use of the land
   -- can receive most kinds of waste, preventing need for separation
   -- simple, easy to manage

   Disadvantages of a sanitary landfill:

   -- possible difficulty of choosing a site (objections of nearby residents)
   -- recoverable if resources get buried
   -- proper standards must be observed or site may turn into an open dump

5. Advantages of a recycling center:

   -- "waste" materials are reclaimed
   -- cuts down on amount of waste being disposed of
   -- can generate income for city, civic organizations, individuals

   Disadvantages of a recycling center:

   -- markets for reclaimed materials can fluctuate
   -- citizens must understand preparation requirements (separating different colored glass, newspapers from higher-quality paper, etc.)
   -- in rural areas especially, carting the collected materials to buyer may be prohibitively costly

6. Advantages of incineration:

   -- reduces amount of waste being disposed of through burying
   -- incineration is adaptable to energy recovery processes
   -- in situations where waste must be hauled long distances to the landfill, incineration may be economically advantageous if nearby locations can be found for the incinerator

   Disadvantages of incineration:

   -- requires large capital expenditures and high operating costs
   -- skilled labor is required for proper maintenance and operation
   -- residents may object to building incinerator

7. b.

8. c.

9. a.

10. c.

11. c.

Name: ____ Class: ____________

1. Circle three kinds of containers used to store or transport solid waste:

LITTER RECEPTACLES REFUSALS

TRAILERS DUMPSTERS COMPACTOR TRUCKS

2. List two places on the school grounds where it is proper to store solid waste:

____________________________ ________________________________

3. List two problems that confront sanitation workers on their daily rounds:

____________________________ ________________________________

4. List one advantage and one disadvantage in using a sanitary landfill to dispose of solid waste:

Advantage: ____

Disadvantage: ____

5. List one advantage and one disadvantage in using a recycling center to dispose of solid waste:

Advantage: ____

Disadvantage: ____

6. List one advantage and one disadvantage in using incineration to dispose of solid waste:

Advantage: ____

Disadvantage: ____

* * *

Circle the best completion for each statement.

7. Garbage, trash and debris are also called:

a. sewage b. solid waste c. pollution d. junk

8. Garbage, trash or debris that escaped from a container is called:

a. junk   b. biodegradable   c. litter   d. free

9. A compactor is:

   a. a piece of equipment used by the sanitation department.
   b. someplace to store garbage, trash and debris.
   c. a piece of equipment used in construction.
   d. something a woman carries in her purse.

10. The correct definition of recycling is:

   a. collecting papers, bottles and cans.
   b. hydrotherapy.
   c. making new materials from things that have been discarded.
   d. cleaning up litter.

11. Rules about handling garbage, trash or debris are usually written down in a city's:

   a. record book
   b. telephone directory
   c. sanitation code
   d. yearbook

* * *

Write a paragraph on what one of the research committees (other than your own) discovered in its investigation.

APPENDIX A

GLEN CITY SIMULATION STUDY ON SOLID WASTE MANAGEMENT

INFORMATION SHEET

1. The area shown on the map is five square miles.
2. 25,000 people live there.
3. 65% of the people live in the area east of the river.
4. A major four-lane highway, Interstate 876, runs north-south through downtown.
5. Many new people and businesses are expected to move into Glen City in the next few years.
6. The John River is 300 yards wide (it is shown as a dotted area on the map). It can handle logs and small boats, but not large barges. There is a park along its bank (black area) with swimming, fishing and boating facilities. The river flows from north to south. Other city parks are shown as black areas. (Landfill, shown by diagonal shading on the map, will become a park when it reaches capacity).
7. Voters are deeply concerned with the way the city looks and have made it known to city council that they would like more open space areas set aside.
8. The city's downtown area, lower right on map, has just received a $350 million grant for urban development.
9. The city has sufficient energy resources.
10. The lower left portion of the map shows a suburban area and contains 30% of the city's population.
11. The city's railroad system includes both rapid transit as well as large-scale freight service (K & Z Railroad).
12. Recently, several large industrial and commercial corporations signed "agreements to buy" with a contractor who is building a large industrial park across the river (upper left, on map).
13. Glen City is also within a 60-minute drive of a large city.
14. Most of the factories are located in the present industrial area.
15. The city's unemployment rate is equal to that of the nation.
16. The city's old incinerator, located on the John River (white circle in landfill dotted area) was closed down due to air pollution control laws.

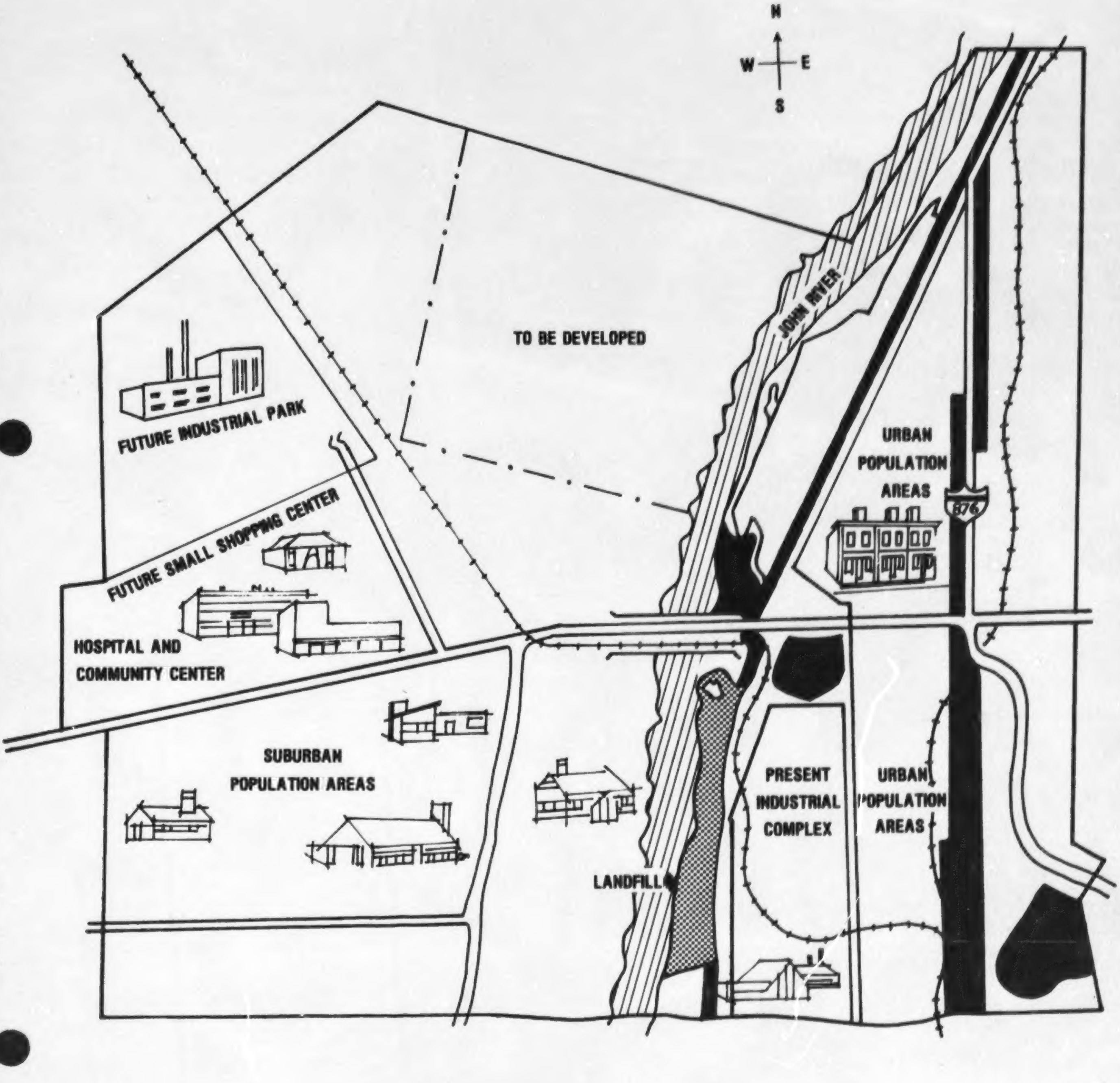
17. The landfill used by the city since its founding, will shortly reach its capacity.

18. Several local businessmen are trying to buy some land between the future industrial park and a main local road, where they would like to construct a small shopping center and, in cooperation with city government, a small hospital and community college.

SIMULATION SITUATION

A farmer who owns 350 acres along the John River recently passed away. After completing an extensive survey, a private consultant for the city has recommended that the land be used as a solid waste processing site. Several systems were proposed, specificially (a) a long-life (50-60 years) sanitary landfill, (b) an energy-generating incinerator, (c) a reclamation center or (d) a resource recovery system. Based on considerable public reaction to each of the systems proposed, city council has now decided to conduct a series of public hearings to determine what method will be adopted. In the meantime, the council has decided to create a temporary (3-5 years) landfill, to handle wastes until the long-term system is functioning. $250,000 is available for new equipment to store, collect and carry waste to the new disposal site.

GLEN CITY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TO BE DEVELOPED
JOHN RIVER
FUTURE INDUSTRIAL PARK
FUTURE SMALL SHOPPING CENTER
HOSPITAL AND COMMUNITY CENTER
URBAN POPULATION AREAS
876
SUBURBAN POPULATION AREAS
PRESENT INDUSTRIAL COMPLEX
URBAN POPULATION AREAS
LANDFILL

APPENDIX B

LEGAL COMMITTEE RESPONSIBILITIES

1. Call the Clean City Committee or the office of the Director of Public Works in city government and find out who makes sure people follow the rules about solid waste management in our community.

2. Write a letter (or call) to invite someone from the agency responsible for seeing that the rules about solid waste management are kept, to come to the school and tell the class about the laws. (Police, Sanitation, Health Departments)

3. Ask that person if these rules -- laws, ordinances -- are enforced. If they are, find out how. Do people get tickets for putting trash or garbage out on the sidewalk in open containers? Do people get fined for not having a big enough dumpster to hold all the solid waste generated in a store or restaurant? What are fines for breaking these laws? Do most people obey them without getting fines or do most people ignore them and just put out waste any old way?

4. If people don't pay much attention to the laws about managing solid waste, ask the person who is responsible for enforcing the laws. Why they are ignored?

5. Find out what other kinds of laws there might be to tell people how they should manage their waste. Ask the Clean City Committee, sanitation workers, your parents.

6. Look at the Glen City Information Sheet. What is happening in the city that might get people to follow new rules? Look at #7 and 8. Will special rules be needed for #12 and 14?

7. From what you have learned, decide on five rules for managing waste -- rules for families, rules for businesses, rules for people on the street -- rules you think people will follow ... that Glen City should have in its waste management plan.

8. Write down those rules and, when the time comes to play the "Glen City Council" part of the game, tell the "Council" what this committee thinks the laws should be.

9. Be prepared to explain why the committee thinks these rules are important and why people would follow these rules if they knew about them.

APPENDIX C

EQUIPMENT COMMITTEE RESPONSIBILITIES

1. Look around the community -- in your neighborhood, around the school, downtown, wherever you go in the next few days -- and try to see what kinds of equipment are used to store, collect and carry solid waste to the disposal site. What kinds of containers do people put outside their homes for garbage pickup? What kinds of containers do businesses use outside their stores or factories.
    a. make a list of the containers you see.
    b. decide which ones do the best job.
2. Contact the Sanitation Department or the Clean City Committee and ask if someone can come to the school with some of the trucks and other machinery used to handle solid waste and tell the class about them.
    a. ask the sanitation workers if these are the best kinds of trucks or machinery for the job? If the city had more money, would it buy new equipment? What kind of equipment would it buy? What would it cost?
    b. show your list of the best containers to the sanitation people. Ask them if they agree that these are the best containers. Do they know of other kinds of containers that might be better? Do they know how much they cost?
    c. find out if the sanitation people have equipment catalogs the Committee might borrow, so you can see what is available and make more suggestions for the kind of equipment Glen City should have.
3. Review all the ideas you have about containers and equipment.
    a. look at the Glen City Information Sheet to see if there is anything that should be considered before deciding on what kinds of containers and equipment you will recommend to the Glen City Council. Look especially at #6, 7, and 8 when thinking about containers. Look at #3, 5, 8, 10, 11, 14, and 18 when thinking about equipment.
    b. make a list of the number and kinds of containers and piece of new equipment Glen City should have. Figure out how much everything would cost.
    c. look at the Information Sheet and see how much the City has to spend.
    d. if the things on your list would cost more than the City has to spend, either take some things off your list, or look at the Information Sheet to see if there is any way to get more money for containers and equipment.

4. Prepare your final list of recommended new equipment and containers to present to the Glen City Council. Be prepared to discuss your recommendations and the reasons for them with the class.

APPENDIX D

DISPOSAL METHODS COMMITTEE RESPONSIBILITIES

1. Ask your teacher to arrange for you to visit the sanitary landfill in your community, or invite someone from the Sanitation Department to visit the class and describe the landfill and how it operates. Ask that person to bring pictures, maps and diagrams.

2. Call the Sanitation Department or the Clean City Committee and find out if there is a citizen (or municipal) recycling center in your community. If there is, ask the teacher to arrange for this Committee to visit it, or invite someone from the Center to talk to the class. (If there is no recycling center in your community, ask your teacher to obtain the film "Realities of Recycling" or "Ecology Lady.")

3. Ask your teacher to arrange for you to see the film, "Resource Recovery Is..." Divide the Committee into two "literature search" teams. One team is to go to the school library and look up books and articles about sanitary landfills, recycling centers, incineration and resource recovery systems, the other team is to go to the Public Library and look up the same material.

4. When meeting with people from the Sanitation Department or Recycling Center (1 and 2, above) ask them to explain some of the advantages and disadvantages of the three forms of solid waste disposal you are finding out about -- sanitary landfill, incineration to recover energy and resource recovery. Take notes on what they tell you.

5. After the "literature search" teams have found out everything they can at the libraries, and the Committee has visited the landfill and recycling center and seen the film, "Resource Recovery Is..." make lists of all the advantages and disadvantages you have discovered about each of the three disposal methods.

6. Discuss this among yourselves until you can agree on the method you wish to recommend to the Glen City Council, and on the reasons why the Committee thinks the method chosen is the best one for Glen City.

7. Be prepared to make this recommendation to the Glen City Council and to discuss your suggestion with the rest of the class.

APPENDIX E

TEMPORARY LANDFILL SITING COMMITTEE

1. Ask the teacher to arrange for this Committee to visit the sanitary landfill in your community.
    a. Notice the roads going in to the landfill. Do they go past many houses? Stores? What do they go past?
    b. Ask the landfill operator what has been done to prevent leachate from the buried waste from running off into the ground water or nearby streams.
    c. Find out how many people are served by this landfill.
    d. How big is it? Ask the landfill operator how big a landfill would be needed to take care of the waste of a city of 25,000 people with a number of factories for five years.
    e. Ask the landfill operator what is done to keep the solid waste from getting loose and turning into litter before it is covered with earth.
2. After you have made notes of what everyone learned at the landfill, look at the Glen City Information Sheet and the map.
    a. Find all the open space that could be used for a temporary landfill. (How much land will be needed to take care of the solid waste generated by 25,000 people for five years?)
    b. Mark on the map the places where most of the solid waste will come from. Draw lines in pencil from those places to your first choice for the new landfill. To your second choice. Third choice. Which possible site requires the least carrying of solid waste? When the buildings now being planned are completed, which will be the shortest distance trucks carrying solid waste will have to go to dispose of it at your first choice for the temporary landfill?
3. Would the trucks carrying solid waste to your first choice for the temporary landfill have to go through many streets where people live? Would this cause a problem? What could be done about it?
4. Is your first choice for the landfill near the river? Might this allow leachate from the buried solid waste to pollute the river? What could be done about it?
5. How many new roads would have to be built to permit trucks to get to your first choice for the temporary landfill site? Where would they go?

6. Ask your parents, other adults, how they would feel if

    a. the city built a landfill near your house

    b. trucks had to go past your house to get to the landfill

    c. the city built a solid waste transfer station on your street

   If they say they would be very unhappy if one of these things happened, ask them what they would do about it.

7. Might any of the people in Glen City object to having the temporary landfill where you are planning to put it? Would they object to having trucks go by their houses or businesses? Would they object to waste getting loose and blowing on their property? What could be done about their objections?

8. Discuss these points, then decide on the site the Committee will recommend to the Glen City Council. Draw a map of what the landfill will look like. Show the roads leading to it and any other important features you may decide that it should have.

9. Be prepared to present your recommendation to the Glen City Council and to discuss the reasons for it with the rest of the class.

RESOURCE MATERIALS

SIXTH GRADE

A. Audio-Visual Aids

Films:

1. "A Place to Begin" (13½ min.) - The citizens of Macon, Ga., speak about how the CLEAN COMMUNITY SYSTEM (Keep America Beautiful, Inc.'s behavioral approach to changing attitudes about the handling of waste) worked in their city. Contact: Keep America Beautiful, Inc., New York.
2. "Ecology Lady" (15 min.) - Problems of a neighborhood recycling center. Contact: Stuart Finley, Inc., Falls Church, Va.
3. "Resource Recovery Is..." (20 min.) - Major approaches to recovery of resources, featuring communities already employing these methods. Contact: Modern Talking Picture Service, New York.
4. "Sanitary Landfill" (15 min.) - A sanitary landfill foreman describes his job. Contact: NACD, Distribution Branch, National Audiovisual Center (GSA), Washington, D.C.
5. "To Four Parts Refuse" (15 min.) - Describes a well-planned landfill. Contact: NACD, Distribution Branch, National Audiovisual Center (GSA), Washington, D.C.

B. Bibliography

Teacher:

1. Hammerman, Donald. Teaching in the Outdoors. Burgess Publishing Co.: Minneapolis (1973).
2. Milliken, Margaret. Field Study Manual for Outdoor Learning. Burgess Publishing Co.: Minneapolis (1968).

Student:

1. Houston, Walter. You and Your Environment. Xerox Corporation: Middletown, Conn. (1971).
2. Soucie, Anita. Sharing the Earth. Scholastic Book Services: New York (1971).